RAILROAD GAZETTE

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## Contributions

### The M. C. B. Brake-Shoe Tests.

Chicago, July 23, 1901.

TO THE EDITOR OF THE RAILROAD GAZETTE.

In my communication of June 24, concerning the Master Car Builder Committee's report on brake-shoe tests at the Saratoga convention, reference was made to the different action of certain brake-shoes when tested upon the chilled wheel and upon the steel-tired wheel. This difference, while apparent in the diagrams published, is much more clearly shown in the diagrams herewith, which give the records of tests arranged with the speed constant and the loads varying. Some shoes show practically the same retarding power on both the chilled wheel and the steel tire. Others show a drop in the retarding power on the steel tire in comparison with the record under similar conditions on the chilled wheel; and others, again, show a decided rise in frictional effect acting on the steel tire as compared with the chilled wheel. Further discussion of this point may be of interest in connection with the more complete diagrams now presented.

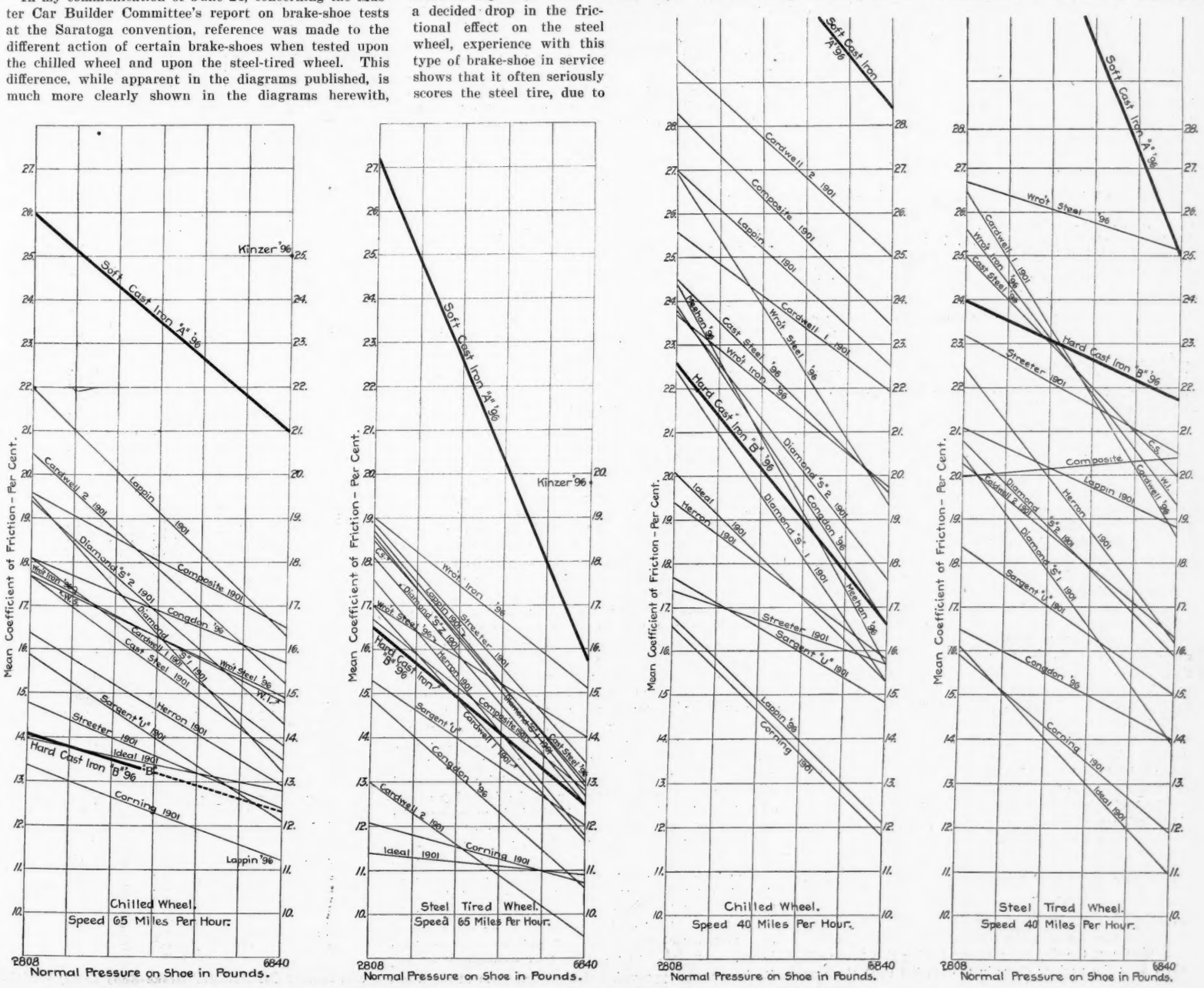
*Brake-Shoes Showing the Same Friction on the Steel Tire as on the Chilled Wheel Under Similar Conditions of Service.*—In this case it seems apparent that there is very little action of the shoe in wearing the wheel, and that the only loss in metal is that due to the abrasion of the shoe face. The chilled shoes, the Corning, the Sargent "U" and the Lappin (with chilled section) show practically no change in position on the two wheels which would indicate that this type of shoe has practically very little effect in wearing the wheel, all the friction being due to the wear of the shoe. Service records confirm this supposition because there have been, to my knowledge, no complaints of injury to the wheel, either steel or iron, in the use of chilled section shoes in which the chill merges into the soft iron without making a cutting edge.

*Brake Shoes Showing Less Friction on the Steel Tire Than on the Chilled Wheel Under Similar Conditions of Service.*—In this case the drop in retarding power appears to be due to the nature of the metal in the shoe rather than to any action of the shoe upon the wheel or vice versa. The two Cardwell shoes, the Lappin shoe (made under the Hatt patent) and also the "Composite" shoe, show each a marked drop in friction on the steel-tired wheel; these shoes may be called soft shoes, the appearance of their structure and their hardness as tested by drilling, indicating unchilled cast-iron. The particles ground off from these shoes appear largely as a very fine soot-like powder, which is suggestive of graphite, especially in one of the Cardwell shoes, whose action seems to indicate somewhat of a lubricating effect on the part of the pulverized metal of the shoe. These shoes wear approximately the same on both wheels and the change in the retarding power is explained by the fact that the detached particles slide rather than roll on the face of the steel-tired wheel.

The Congdon shoe belongs to this class, but its action must be explained in a different way. While showing a decided drop in the frictional effect on the steel wheel, experience with this type of brake-shoe in service shows that it often seriously scores the steel tire, due to the flowing and burning of the wrought iron insert which forms hard spots that cut the tire. It would, therefore, be reasonable to expect a higher friction on the steel tire. The test shows exactly the reverse. From the records of the hard cast-iron "B" shoe of 1896 and the wrought-iron shoe of the same year we should expect a higher frictional record on the steel wheel. Experience, however, with the wrought iron shoe on the steel-tired wheel has been such as to indicate that this metal glazes over and becomes very similar to chilled iron, giving great resistance to wear and evidently doing very little work (so long as no change takes place in the nature of the bearing face) but the tendency of wrought iron to soften on the edges, to flow, then burn and pick up and weld onto itself any small particles of steel from the tire, results in the formation of hard spots that do the cutting. Inasmuch as the records of test make no mention of tire-cutting on the part of the Congdon shoe, it is reasonable to suppose that the wrought iron inserts simply glazed over and reduced the friction.

The two Diamond "S" brake-shoes show very closely agreeing results, and represent a shoe made by the Sargent Co., and one made by the Ramapo Foundry Co. The records show a slight drop in the frictional effect of these shoes upon the steel tire, as compared with their record under similar conditions on the chilled wheel. This would indicate that there is no severe action of this class of shoe on the steel tire. In fact, service records indicate this to be the case. The percentage of mild steel appearing in the face of this shoe is very small in comparison with the hard cast-iron and is constantly changing, both in proportion to the cast-iron and in location. All that the strands of mild steel in the wearing face of the Diamond "S" shoe do, is to retard the rapid grinding of the cast-iron, thereby prolonging the life of the shoe; the main portion of the steel insertion being in the body of the shoe as a reinforcement against fracture.

*Brake Shoes Showing Greater Friction on the Steel Tire Than Upon the Chilled Wheel Under Similar Conditions of Service.*—Under this head are grouped what is known as tire dressing shoes, including composite shoes with hard inserts arranged to present hard cutting edges, which act like the cutters of the milling tool in wearing away the tire; also those shoes of tough and ductile material, such as wrought iron, wrought steel and cast steel which, by their toughness and hardness, under the effects of friction, cut into the tire. The Herron, the Streeter and the Meehan shoes are composite insert shoes provided with transverse or diagonal cutting edges.




**Diagrams Showing Results of M. C. B. Brake Shoe Tests, 1896-1901.**

All these shoes show greater effect when acting on the steel tire than upon the chilled wheel and the exprience in service proves conclusively that these shoes of the third group act upon the steel tire much more rapidly than shoes of a granular structure like those of the second group; or shoes without cutting edges, like those of the first group. Hence it is evident that the increased friction is at least in part due to the wear of the tire.

It will be noticed that the hard cast shoe "B" of the 1896 test does not follow in line with the action of the shoes in the second group, but that this shoe actually rises in frictional effect when tested against the steel tire. A possible explanation of the action of this shoe may be derived from the fact that the Lappin and Cardwell shoes of the second group were made especially for test and are undoubtedly of different metal from that of the "B" shoe, which is simply a hard car-wheel iron, which, in grinding, will not give the very fine soot-like powder obtained from the other shoe. The "Composite" shoe shows a very peculiar record which may possibly be due to a lubricating effect produced by the charring of the cork inserts. The Ideal shoe really belongs to the first class, from the fact that it is practically a Corning or Lappin shoe with the addition of two pockets filled with a compound of asphalt and iron turnings. This insertion expands under the effect of heat and changes its nature. As indicated in the report, the asphalt separates and flows over the wheel face, which doubtless accounts for the variable friction which this shoe shows in the record. However, the chilled faces of this shoe limit its frictional qualities and place it with the shoes of less efficiency.

The diagrams give all the tests made by the M. C. B. Association to date, and show in a simple manner the relative merits of each type of shoe for railroad service. To the manufacturer the diagrams will be interesting in showing him what may be expected from the use of certain metals or combinations of metals in the brake-shoe. To the railroad man the diagrams will indicate what he may expect in the way of train control from the various shoes offered for his consideration.

The question of train control is the primary object in the selection of a brake shoe, and the best brake-shoe practice is based upon the use of an unchilled cast-iron brake-shoe, yet the question of cost of adjustment and replacement of brake-shoes is a factor to be considered. Also to these must be added the action of the shoe on the wheel face, so that three things determine the selection of a brake-shoe: Retarding power; durability of shoe, and the action of the shoe on the tire. Freely speaking the retarding power or friction means either excessive wear of the shoe or wear of the wheel, and as for car service the wear of the wheel is undesirable we must select for such service shoes which cannot injure the chilled wheel or the steel tire. Car service shoes may then be divided into two sections as shown in the tables.

quirements, which practically exclude those shoes which owe their great durability to a large proportion of chilled iron in their wearing face. It will be noticed that such shoes have neither retarding power nor tire-dressing action.

The question of the durability of the various brake-shoes, as shown by the last M. C. B. laboratory tests, has not been touched upon for the reason that a careful study of the records develops results which are not confirmed in any way by service, or by the structure of the shoes tested. Further, I do not think the small amount of metal worn from the brake-shoes in question, is a sufficient indication of what they will do in service, to enable fair conclusions to be drawn, and also because certain of the shoes tested are made especially for test, while other shoes are taken from stock of railroads which have used the shoes for some time. At the time of the M. C. B. test in 1896, the effort to obtain reliable data as to the wear of the brake-shoes tested on the M. C. B. machine failed completely, owing to the great variation in the results, and the writer's own experience in testing shoes on a small machine has convinced him that the only safe measure of a brake-shoe's durability is obtained by the wearing out of several sets of shoes in actual service on the road.

The introduction of extra durable brake-shoes has been credited to the supply man. I do not think this is exactly true. My own experience has demonstrated that the railroad official who demands a brake-shoe which will wear longer and cost less than the one he is using, is to blame. There is no incentive to put a hard shoe on the market if no one will buy it, but just so long as the cry goes forth from the "Economical" purchasing agent or master car builder for brake-shoes that will not wear out, just so long will inventive genius be exercised in producing brake-shoes which surpass in the line of least resistance—to the wheel. Let us hope that the specifications noted will turn the effort in the other direction.

F. W. Sargent,
*Managing Engineer American Brake Shoe Co.*

## High-Speed Electric Traction at Berlin.

There appeared in the American press about three months ago a paragraph in which it was stated that an experimental test of electric trains had been made between Berlin and Hamburg, by which a speed of 125 miles an hour had been readily attained. This statement was widely republished, generally as the text of editorial congratulation that the problem of greatly increased speed in railroad travel had been so promptly and conclusively settled. From this the deduction was easy and natural that within a few years, the present steam railroad system would be wholly superseded for passenger traffic by electrical lines. All this was so far from the actual fact and has inspired such a chorus of vain but insistent inquiry, that it seems due and requisite that a plain, concise statement shall be made of what has been undertaken by the experimenters at Berlin, what has been accomplished, and what yet remains to be done.

For several years past, it has been recognized in Germany, as elsewhere, that cars driven by electricity would sooner or later dispute the supremacy of steam railroads for long-distance passenger traffic. No careful engineer or capitalist would, however, enter upon the construction of a high-speed railroad for actual service until the whole subject had been thoroughly studied. For this purpose there was organized at Berlin, on the 10th of October, 1899, a so-called "Studien Gesellschaft," or "company for experiments," in high-speed traction.

This company—which has for its president Dr. Schulz, Chief of the Imperial Railroad administration—includes as members the General Electric Company of Berlin, Siemens & Halske, Börsig, Krupp, Halzmann, and Van der Zuypen & Charlier, besides several banks, which undertook to supply the capital of $178,500 for expenses of construction. The mere mention of the foregoing names will show that the Studien Gesellschaft represents the foremost scientific and mechanical ability of Germany. After more than a year of study and experiment with motors, conductors, and especially the problem of taking current by a motor at high speed, Director Rathenau, of the General Electric Company, in January of this year, had a formal interview with the German Emperor, in which he submitted a plan for using as an experimental electric line the military railroad leading southward from Berlin to Zossen, 18.6 miles. The proposition of Mr. Rathenau was approved, and from that moment the whole

*Chilled Wheels; Freight Service—Speed 40 Miles Per Hour; Pressure on Shoe 2,808 Lbs.*

| Maximum Friction and Minimum Durability. | Medium Friction and Medium Durability. | Minimum Friction and Maximum Durability. |
|---|---|---|
| Cast iron shoes, including: | Composite shoes, including: | Chilled shoes, including: |
| Cardwell (made for test) | Diamond "S" | Sargent "U" |
| Lappin, Hatt patent (made for test) | Herron | Corning |
| "Composite" | Congdon | Lappin |
| Hard cast iron | Streeter | Ideal |

*Steel Tired Wheels; Passenger Service—Speed 65 Miles Per Hour; Pressure on Shoe 6,840 Lbs.*

| High Friction and Minimum Wear of Tire. | High Friction and Maximum Wear of Tire. | Minimum Friction and Minimum Wear of Tire. |
|---|---|---|
| Cardwell (made for test) | Herron | Sargent "U" |
| Lappin, Hatt patent (made to test) | Meehan | Corning |
| Composite | Streeter | Lappin |
| Diamond "S" | | Ideal |
| Hard cast iron | | |

The steel and wrought iron shoes are not advisable for use on chilled wheels, as service tests have demonstrated that the wheels are injured by the flowed and burned metal on the edges of the shoes, also on account of the fact that these shoes get highly polished and hardened on the bearing face and fall off in their retarding power. The use of wrought iron shoes on chilled wheels, on heavy grades, has also been the cause of numerous cracked wheels.

In passenger service, where the steel-tired wheel is comparatively small in diameter, the necessity of tire dressing on the part of the brake-shoe is not nearly so great as in the case of the heavier loaded wheel of the locomotive. The Congdon shoe has not been included in the consideration of passenger shoes for the reason that it is very undesirable for use on the steel tire.

The Sargent "U" shoe is included among those of minimum friction, but it should be noted as occupying a much higher position in the frictional scale than the other chilled shoes, which have a much larger proportion of hard bearing face.

The brake-shoe specifications adopted by the M. C. B. Association are as follows:

*On Chilled Wheel at Speed of 40 Miles an Hour.*

22 per cent. mean coefficient friction at 2,808 lbs. on shoe.
20 per cent. mean coefficient friction at 4,152 lbs. on shoe.
16 per cent. mean coefficient friction at 6,850 lbs. on shoe.

*Steel Tired Wheels at 65 Miles an Hour.*

16 per cent. mean coefficient friction at 2,808 lbs. on shoe.
14 per cent. mean coefficient friction at 4,152 lbs. on shoe.
12 per cent. mean coefficient friction at 6,850 lbs. on shoe.

A glance at the diagrams accompanying this letter will show how the various shoes in the market meet these re-

*MEAN COEFFICIENT OF FRICTION—PER CENT.*

| CLASSIFICATION. | NUMBER OF SHOE. | NAME OF SHOE. | MAKER OF SHOE. | DESCRIPTION OF SHOE. | Speed 40 Miles per Hour. Chilled Wheel. Brak. Pres., Lbs. 2,808. | Speed 40 Miles per Hour. Chilled Wheel. Brak. Pres., Lbs. 6,840. | Speed 65 Miles per Hour. Steel Tired Wheel. Brak. Pres., Lbs. 2,808. | Speed 65 Miles per Hour. Steel Tired Wheel. Brak. Pres., Lbs. 6,840. |
|---|---|---|---|---|---|---|---|---|
| Plain cast iron shoes | A—1896 | Soft cast iron | Pennsylvania R. R., Altoona, Pa. | Very soft cast iron | ... | 34.6 | 37.0 | 25.0 |
| | B—1896 | Hard cast iron | Ramapo Iron Works, Hilburn, N. Y. | Hard unchilled cast iron | ... | 28.4 | 37.0 | 25.0 |
| | 56—1901 | "Composite" | Composite Brake Shoe Co., Boston, Mass. | Soft cast iron with cork inserts | 29.6 | 16.6 | 24.0 | 21.7 |
| | 47—1901 | Lappin | Lappin Brake Shoe Co., Bloomfield, N. J. | Unchilled, dense cast iron | 15.3 | 23.4 | 20.0 | 20.4 |
| | 52—1901 | Cardwell No. 1 | Drexel Railway Supply Co., Chicago, Ill. | Soft cast iron body, with a harder but unchilled insert in bearing face | 14.8 | 22.5 | 21.1 | 18.8 |
| | 54—1901 | Cardwell No. 2 | Drexel Railway Supply Co., Chicago, Ill. | Same as 52 | 11.9 | 21.9 | 26.5 | 18.6 |
| Expanding insert shoe | P—1896 | Kinzer | Kinzer & Jones Fdy. Co., Pittsburgh, Pa. | Soft cast iron box filled with elastic compound | 11.8 | 25.0 | 20.5 | 16.3 |
| Ductile, tough insert shoes | 57—1901 | Diamond "S" No. 1 | The Sargent Co., Chicago, Ill. | Hard cast iron permeating a bundle of expanded sheet steel | 16.6 | 29.6 | ... | 23.1 |
| | 58—1901 | Diamond "S" No. 2 | The Sargent Co., Chicago, Ill. | Same as 57 | 15.3 | 22.4 | 20.5 | 13.9 |
| | H—1896 | Congdon | The Sargent Co., Chicago, Ill. | Hard cast iron body and wrought iron inserts | 17.6 | 23.8 | 20.8 | 15.9 |
| Hard insert shoes | 51—1901 | Herron | Eureka Foundry Co., Cincinnati, Ohio | Hard cast iron body and white iron inserts | 16.6 | 23.9 | 16.5 | 14.0 |
| | 49—1901 | Streeter | Streeter Brake Shoe Co., Chicago, Ill. | Hard cast iron body and white iron insert | 15.8 | 19.4 | 22.5 | 16.2 |
| | I—1896 | Meehan | The Sargent Co., Chicago, Ill. | Hard cast iron body and crucible steel inserts | 15.7 | 17.4 | 23.2 | 20.5 |
| Ductile, flowing and burning shoes | L—1896 | Wrought steel | Schoen Mfg. Co., Pittsburgh, Pa. | Mild steel, forged to shape | 15.7 | 24.4 | ... | ... |
| | M—1896 | Wrought iron | Schoen Mfg. Co., Pittsburgh, Pa. | Wrought iron, forged to shape | 19.3 | 26.9 | 26.7 | 25.1 |
| | C—1896 | Cast steel | Solid Steel Co., Alliance, Ohio | Mild open hearth cast steel | 19.7 | 23.7 | 25.6 | 19.3 |
| Chilled iron shoes | 53—1901 | Ideal | Spears & Miller, Chicago, Ill. | Hard cast iron; three chilled spaces and two pockets filled with asphalt compound | 19.6 | 24.5 | 25.0 | 20.0 |
| | 55—1901 | Sargent "U" | The Sargent Co., Chicago, Ill. | Hard cast iron with tapered ends chilled from back | 15.3 | 20.1 | 16.1 | 11.0 |
| | J—1896 | Lappin | Lappin Brake Shoe Co., Bloomfield, N. J. | Hard cast iron with three chilled faces | 14.8 | 17.7 | 18.4 | 15.0 |
| | 50—1901 | Corning | Corning Brake Shoe Co., Corning, N. Y. | Hard cast iron with two chilled faces and one soft insert | 12.1 | 16.8 | ... | 11.9 |
| | | | | | 11.8 | 16.6 | 15.8 | |

**The Master Car Builders' Brake-Shoe Tests, 1896-1901.**

scheme has had the active support of the Imperial Government. The line to Zossen is now in preparation for the trials which, it is expected, will begin in August or September. For these experiments two motor cars will be, or have been, built—one by the General Electric Company, the other by Messrs. Siemens & Halske. Each will carry about 50 passengers, and efforts will be made to attain a speed of from 125 to 150 miles an hour.

Meanwhile, Messrs. Siemens & Halske have been making some preliminary tests on a short provisional line, which was built for experimental purposes a year or two ago, at their works at Lichterfelde, near Berlin. The motive of these preliminary trials has been to test the important, but hitherto undemonstrated, point whether a motor moving at a speed of 100 miles an hour or more will take the current readily from a three-wire line.

It is well known that there are certain electric roads in Switzerland and Northern Italy where alternating currents of high potential are used, instead of the 500-volt continuous current which is employed on most city tramway lines. In using this three-phase alternating current, it has been found necessary to employ three conductors, viz., two overhead wires and a third rail. The high-speed experiments here will be based on this arrangement, and the provisional line of Messrs. Siemens & Halske has carried a step further the experience already gained by the Swiss and Italian roads at ordinary speeds, and yielded some highly interesting and valuable results.

This, then, is the present status of the enterprise. There is no electrical railroad between Berlin and Hamburg, nor will one be seriously thought of until the high-speed experiments on the short line between Berlin and Zossen have demonstrated exactly and conclusively every condition of the problem. These experiments will be undertaken when the line to Zossen is specially prepared and the two motor cars now being built for that purpose are ready. That these preparations are not yet complete is shown by the fact that the Society of British Engineers, which visited Berlin a few days ago as guests of Messrs. Siemens & Halske, saw the provisional three-wire testing installation at Lichterfelde, as well as the motor car built for the coming experiments by the General Electric Company, but were not taken to see the railroad to Zossen. The real difficulties of the problem have yet to be met.

FRANK H. MASON,
BERLIN, July 9, 1901. *Consul-General.*

## Philadelphia & Reading Coaling Station at Philadelphia.

The accompanying illustrations show the coaling station of the Philadelphia & Reading Railroad at the Pennsylvania Avenue Subway in Philadelphia, as equipped with Link-Belt elevating and conveying machinery for handling coal and ashes. It is one of the largest plants that has been built. It is an iron building with a storage capacity of 1,000 tons of coal and 40 tons of ashes. The coaling machinery will handle 120 tons of coal per hour—two tons per minute—and the ashes machinery 20 tons per hour.

The main storage pocket spans eight tracks and from seven of these tracks locomotives can receive coal and discharge ashes simultaneously, while on the eighth track cinders are being transferred from ash pocket to cars. In addition to the seven terminal tracks a coaling bridge extends over four running tracks, to which coal is delivered by hand cars moving on their own system of rails and turntables, receiving the coal from the pockets as shown in Fig. 2, and delivering as shown in Fig. 1. Thus it is possible to supply 11 locomotives with coal at one time, while seven of them are also discharging ashes into the Link-Belt open-top carrier. The ashes, as dumped from the locomotives, are fed to the buckets of this carrier by automatic gates so arranged that the ashes feed absolutely into the pockets and cannot run or spill over the sides. This is shown in Fig. 2. The carrier is equipped with self-oiling devices, reducing to a minimum the power required to operate it. The rollers are chamber-cored and means are provided to automatically renew the supply of oil while in operation.

The coal is dumped from drop-bottom cars, and passes through the steel track-hopper onto an apron-conveyor that gives an even delivery to the boot and thereby prevents choking and crunching. The elevator is of the gravity discharge type, on which the Link-Belt Engineering Company holds patent rights. It is composed of large capacity V-shaped pockets centrally hung and rigidly attached to two strands of chains. In passing through the foot of the elevator or boot, they scrape up their loads and elevate them to the top of the pocket and then convey along a short horizontal run, pushing the coal before them and gently delivering it to the horizontal distributing conveyor.

The interesting features of this horizontal distributing conveyor are its flights, which are prevented from coming in contact with the bottom or sides of the trough by smooth-sliding wearing-blocks attached to their ends, eliminating the noise characteristic of most scraping conveyors and prolonging the life of the flights and of the trough. These flights are attached to a Link-Belt Monobar Chain constructed of 1-in. bolts and 24-in. pitch. Link-Belt equalizing gears are employed to do the driving and thus overcome the jerky, pulsating motion inherent to all chain and wheel mechanisms, especially where the chain has a long pitch.

The trough is provided with discharge gates at proper intervals operated by rack and pinion. These can be opened and closed while the conveyor is in operation; a very desirable feature, effecting a great saving of time.

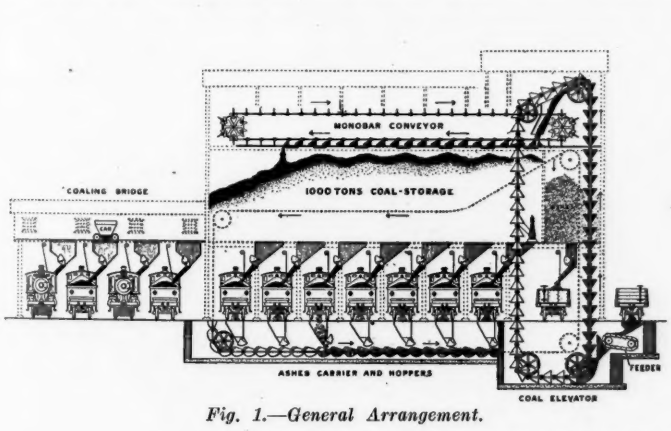



*Fig. 1.—General Arrangement.*

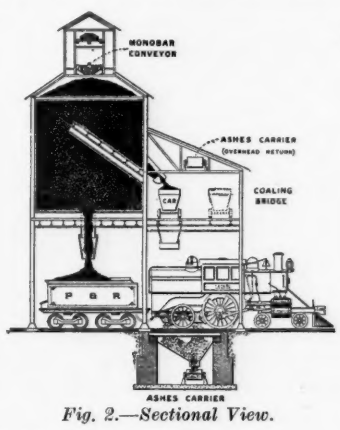



*Fig. 2.—Sectional View.*

**Philadelphia & Reading Coaling Station at Philadelphia.**

## Burning Crude Oil in Locomotives.

In our issue of June 21 last was a discussion of the subject of burning crude oil in locomotives by Mr. W. N. Best, Superintendent of Motive Power and Machinery of the Los Angeles Terminal Ry., and the diagrams now shown make clear the general features of the apparatus used on that road.

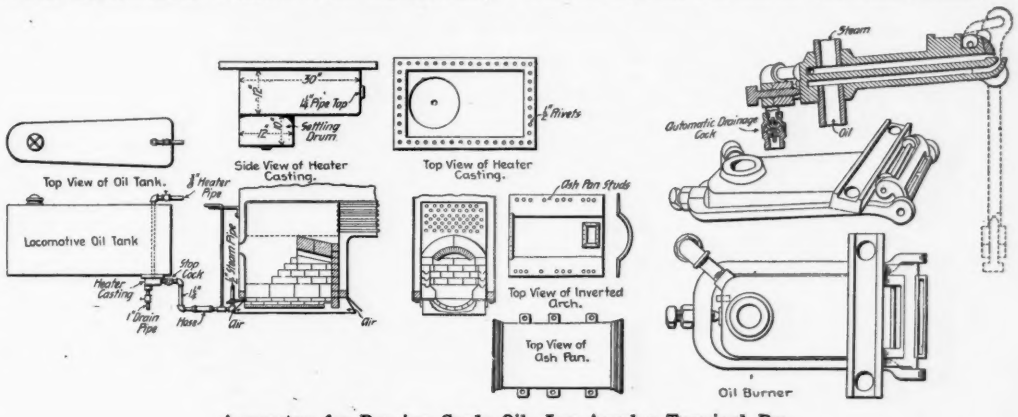
It will be seen that the oil tank is made to fill the coal space in the tender, which is high enough to allow the oil to flow by gravity to the burner. At the bottom and forward end of the oil tank there is a hollow casting to which the oil pipe is attached, and which serves as a heater. Live steam is admitted within this casting near the delivery pipe opening. The oil in the casting is heated as it goes to the burner, although the oil in the large reservoir may be cold. This has overcome a serious difficulty in burning crude oil. With the first apparatus it was attempted to heat all the oil in the main tank by steam coils. It will be seen that under these conditions cold oil would be furnished the burner for some time after a fresh supply was taken. The cold oil could not be atomized properly and gave poor results. The heater casting also has a drum at the bottom for collecting water that may be in the oil. The water is drawn off at intervals through the valve and drainage pipe shown.

Mr. Best uses an inverted arch similar to those commonly used excepting that the hole for the admission of air is just back of the front refractory wall. This location is the result of actual trials. The inverted arch is lined with fire-brick at the rear, and around the air cavity an angle iron is riveted in order to hold the fire-bricks in place.

The refractory arch is of bricks—especially designed, 9 in. thick, fitting closely to the front refractory wall and resting on two wedges which give them the proper pitch. The highest portion of the arch is level with the lower flue and the arch is made one-third the length of the firebox.

The oil burner is here shown, and differs chiefly from others in that the oil channel is below the steam atomizer instead of above it. The nose piece of the atomizer is held in place by a bridle so that it can be quickly removed if the steam passages become stopped. There is also an automatic release valve for draining the steam pipes and passages when the burner is not in use. As shown, a spiral spring acts to raise this drainage valve which remains open until steam is turned on the burner, when it closes automatically. This prevents water from reaching the refractory walls and arch and injuring them.

Mr. Best holds patents covering this form of oil burner and the method of applying the apparatus.




**Apparatus for Burning Crude Oil—Los Angeles Terminal Ry.**

## A Good Run in Daily Practice.

The day express on the Erie, Buffalo to New York, is scheduled to run from Hornellsville to Susquehanna, 140 miles, at an average speed from end to end of 46 miles an hour. This includes seven stops, or about one stop every 20 miles. Obviously, this involves some fast running between stations, and the train is always a heavy one. On the 31st of July a passenger amused himself by taking the times at the mile posts for 20 consecutive miles, as shown in the log below. The train on this occasion consisted of nine cars—a postal car, a baggage and express car, two Pullman parlor cars (six-wheel trucks), one Erie café car (six-wheeled trucks) and four heavy day coaches. It will be seen that the run for this 19 miles was a very pretty one, although undoubtedly there are a good many railroads in the country where daily runs of about this quality are made. The times were taken with an ordinary watch and any one of them may be a second out; but while that would make one mile too fast it would make the next mile too slow. Better timing would, no doubt, have made the column of miles per hour smoother.

| Miles. | Time read. H. M. S. | Time elapsed. seconds. | Rate, miles per hour. | Remarks. |
|---|---|---|---|---|
| 321 | 10 :43 :21 | .. | .... | ..... |
| 320 | 10 :44 :20 | 59 | 61.01 | ..... |
| 319 | 10 :45 :16 | 56 | 64.29 | ..... |
| 318 | 10 :46 :12 | 56 | 64.29 | ..... |
| 317 | 10 :47 :10 | 58 | 62.07 | ..... |
| 316 | 10 :48 :05 | 55 | 65.45 | ..... |
| 315 | 10 :49 :02 | 57 | 63.16 | ..... |
| 314 | 10 :49 :58 | 56 | 64.29 | ..... |
| 313 | 10 :50 :54 | 56 | 64.29 | ..... |
| 312 | 10 :51 :50 | 56 | 64.29 | ..... |
| 311 | 10 :52 :45 | 55 | 65.45 | ..... |
| 310 | 10 :53 :42 | 57 | 63.16 | ..... |
| 309 | 10 :54 :37 | 55 | 65.45 | Brakes |
| 308 | 10 :55 :33 | 56 | 64.29 | ..... |
| 307 | 10 :56 :31 | 58 | 62.07 | ..... |
| 306 | 10 :57 :27 | 56 | 64.29 | ..... |
| 305 | 10 :58 :23 | 56 | 64.29 | ..... |
| 304 | 10 :59 :18 | 55 | 65.45 | ..... |
| 303 | 11 :00 :13 | 55 | 65.45 | ..... |
| 302 | 11 :01 :09 | 56 | 64.29 | Brakes, station |

## The Effect of Stray Trolley Currents.

Electrolysis is considered under this heading by Mr. H. E. McGowan, Mechanical Engineer in charge of the electrical department of the Brooklyn Union Gas Company, in an article in the Stevens Institute *Indicator* for April, giving results of experiments. He compares the underground situation to an electrolytic cell of huge dimensions in which the pipes are the anode, the rails the cathode, and the moist earth the electrolyte; the chlorides, carbonates, sulphates and nitrates, which play a part in electro-chemical action, being inherent in alkali earths. Upon the passage of the smallest current these salts are split up and their acid radicals attack and dissolve pipes while the freed metal, in trying to reach the rails representing the cathode, is deposited in the intervening earth and forms a scale so tough that a sharp rap from a shovel is often needed to dislodge it.

A test was made in Brooklyn with a volt meter, to locate points where the gas mains were positive to the rails. Readings were taken between the gas mains and rails; the mains and water system; and between the different gas systems. These systems were tested between themselves and the rails; between themselves and the water mains and also between the water mains and the rails. In some places the mains of the several original sets are now intimately connected, while in others they

are still distinct, making an interchange of currents between them possible and explaining why destruction is found in places far from the trolley lines. Readings were also made along the water front between the gas mains and the river, where the mains were relatively close to the water.

There are six power houses for trolley roads, and the volt meters showed a field of high readings for each of these in which the power house was the center. These high readings gradually fell away until a circumference was reached where the pipes took on the current and the rails became subject to injury by electrolysis, the action being again reversed and the current given up to the rails with resultant destruction to the pipes when the neighborhood of a power house was again approached. Speaking of stripping gas mains to determine the amount of current carried by them and performing experiments as to their conductivity the writer says, all very well so long as the earth is not in contact with the main, but, he remarks, the first shovelful of dirt begins the interment of all this data as well as of the pipe itself; for when the pipe is buried who can say that all the current is still following the same path as when the experiments were made?

It is said that the greatest damage need not necessarily be expected where the voltage is highest; location of pipes above or below river level; on the approach to a slope or on the brow of a hill; the nature of the soil and the drainage; and the extent of traffic on the trolley line between the place where damage is suspected and the ends remote from the power house are mentioned as determining the amount of injury. The practice of the Brooklyn Union Gas Company is to parallel the mains as far as possible in streets where there are trolley lines; having a main on either side of the street, and thus doing away with long services which would have to pass under the tracks and would be destroyed in a short time.

There are included in the article five illustrations of gas mains in various stages of destruction, which are interesting with the data which accompanies them. All wrought iron service pipe is coated with a paint, of which coal tar is the chief ingredient, rubber being added to keep the surface of the coating from cracking when the pipe is bent. The writer considers this paint no positive cure for electrolysis, but states that where unpainted 2-in. wrought iron pipe lasted but nine months at longest, pipe having this coating has been down two years, and no trouble is yet apparent.

It is said to be helpful to bond the mains with the rails at points where the mains are positive to the rails, thus draining them of the current which otherwise would pass off into the earth. The following condition as once existing in Brooklyn is stated: Five years ago, in a certain section, wrought iron service pipes did not last six months; the mains were later bonded to the rails at various points, and immediately opposite the power house a copper write carrying from 200 to 300 amperes was run in to the negative bus. Since this bonding there has been comparatively little trouble, and consequently a great saving in gas. Bonding has also been done in Long Island City with success.

The writer says finally that there is no complete safety from the action of stray currents unless the trolley roads adopt either the double-overhead or the underground system, and that until this is done gas companies' properties will be jeopardized and life endangered from explosions of escaping gas ignited by current.

## The Largest Marine Railroad in the World.

BY RALPH C. DAVISON.

In September of last year Messrs. H. I. Crandall & Son, of East Boston, Mass., completed the construction of the largest marine railroad in the world for the Townsend & Downey Shipbuilding & Repair Co., whose plant is located on Shooter's Island, in New York Harbor, at the southern end of Newark Bay, and the conjunction of the Kill von Kull and Arthur Kill. This railroad is known as the Crandall improved type, and has a capacity of 4,000 tons. It can handle ships up to 400 ft. in length, drawing 18 ft. forward and 23 ft. aft.

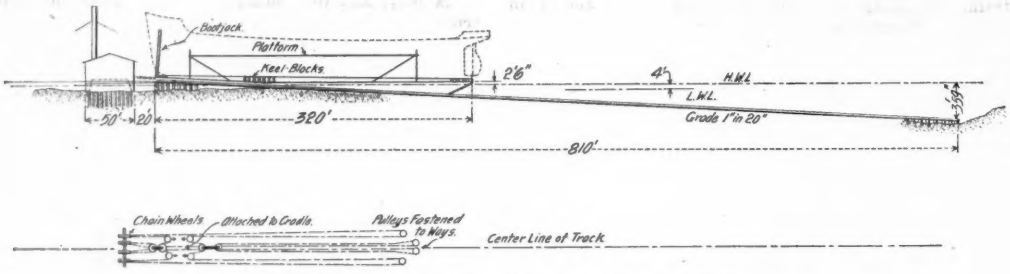



Fig. 1.—General Outline Sketch and Chain Diagram.

The advantages which the marine railroad has over other forms of dry docks are, first, the increased facilities for working on a ship's bottom with plenty of air and light; second, the decreased cost of construction and greater rapidity of operation in docking a vessel, at the same time retaining the qualities of safety and stability found in any other design of dry dock.

The cradle presents a fine free floor or deck, as a glance at the half-tone illustration, Fig. 6, will show. The deck is so situated that there is from 4 to 6 ft. of room between it and the ship's bottom, thus giving ample room under the ship for all repairs, upon a clear floor, placed practically on a level with the surrounding yard, and which is open on all sides to the free access of light and air. These features will be especially appreciated by all those who have worked in basin docks, as there is no climbing in and out, hoisting or lowering of materials and tools and many other annoying and laborious features which are encountered in the before mentioned type of dock. Much time is also saved in not having to wait unnecessary hours for a ship bottom to dry out sufficiently for painting.

A description of the parts which make up this railroad, such as the cradle, the ways and the hauling out gear may be interesting, in that they differ in size and detail, from those of other marine railroads now in operation. This railroad is of timber construction, the builders claiming that a well-designed and constructed timber dock will have a life of from 35 to 40 years.

In Fig. 2 will be seen a part elevation and plan of the cradle, which is 80 ft. wide x 320 ft. long. On both sides of this cradle there are built a series of substantially braced uprights, as shown in the elevation and also in the section seen in Fig. 3. Near the top of these uprights and about 26 ft. from the deck of the cradle is secured the docking platform. This is high enough so as to be at a convenient height above water when the cradle is at its lowest position. From this platform the bilge blocks are operated by means of small hand winches secured to the heads of the uprights. The arrangement of the hand winches, chains, and bilge blocks, can be seen in Fig. 3.

The bilge blocks are of Crandall patent relieving type shown in Fig. 4. These were designed to facilitate the removal of the block from the ship while under load, in order to work on that part of the ship which previously bore on the block. One man can relieve these blocks with but little effort.

In the older types of marine railroads the keel blocks were nearly or altogether on the same incline as the tracks or ways; this gives the vessel an objectionable fore and aft tip, but it will be noticed in the general outline illustration, Fig. 1, that the line of keel blocks in this railroad are level. This is obtained by building the cradle's understructure as shown in Fig. 2. Between the cradle and the rails are placed cast-iron rollers; the system of rollers used is that known as the free roller system. In this system the rollers have no axles on which to revolve, but are held square to the tracks by placing them in a series of frames, which are made in sections for convenient handling. These sections are coupled together and are interchangeable. This arrangement of the rollers greatly reduces the friction over that of the axle method and practically makes a roller bearing over which the loads are hauled.

The cradle is provided with ballast spaces as seen in the illustration. These are filled with ballast to sink the cradle, and to give it stability. This ballast is permanent. The cradle is held when up by a pawl which engages the largest gear wheel. This pawl can be seen in the half-tone illustration of the engine, and hauling-out gear, Fig. 5.

As seen in Fig. 3 a "four-way" system of tracks is used, having two close-lying center tracks which carry the weight of the ship, and two outlying side-tracks which carry the cradle wings and supply a firm support for the bilge blocks.

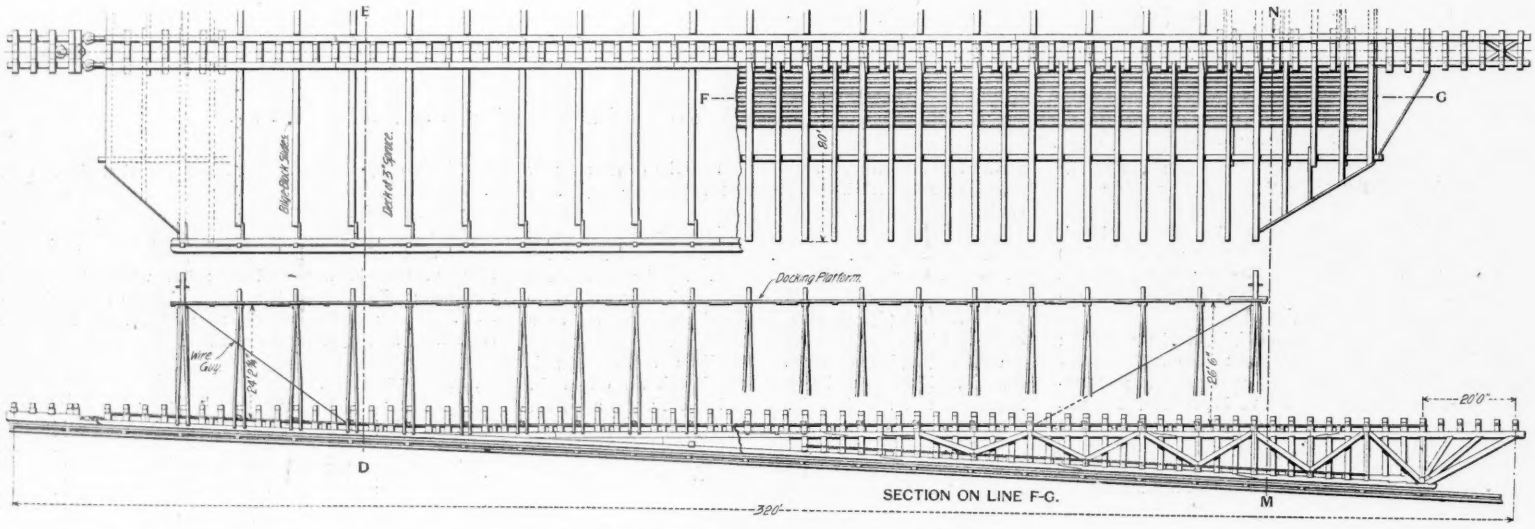



Fig. 2.—Part Elevation, Section and Plan of Cradle.

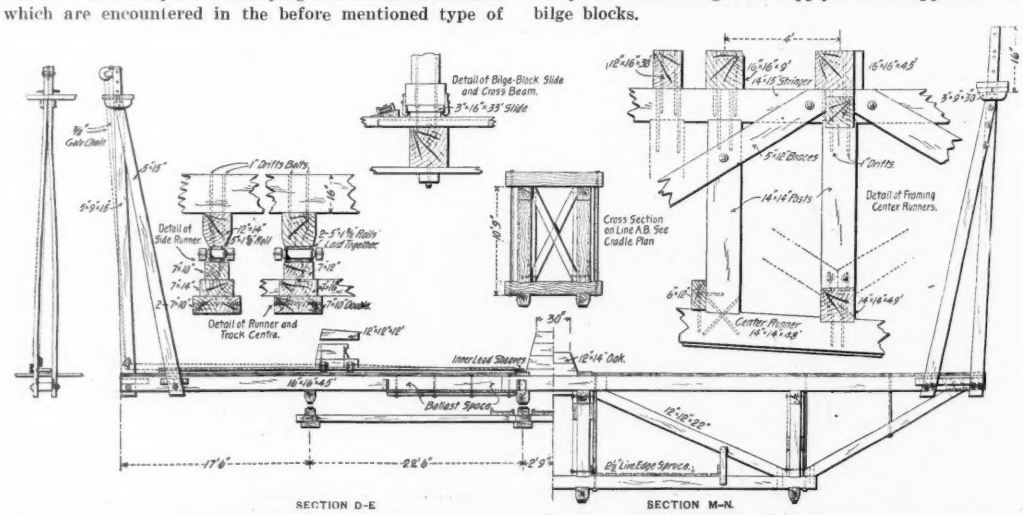
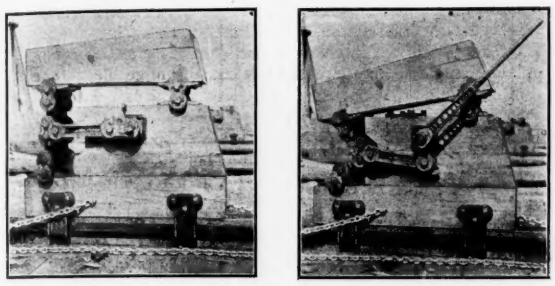

Detail of Bilge-Block Slide and Cross Beam.
Detail of Side Runner
Detail of Runner and Track Centre.
Cross Section on Line A B. See Cradle Plan
Detail of Framing Center Runners.
Center Runner
Inner Lead Sleepers
Ballast Space
SECTION D-E
SECTION M-N.

Fig. 3.—Cross-Section and Details of Cradle.

The track is 810 ft. long and has a gradient of 1 in. in 20 in.; at its extreme end it has a depth of 35 ft. 9 in. below high-water level. The track under water was all built upon land, launched in sections, joined together while afloat and sunk in place in one piece. It was then fastened to a piling foundation which had already been driven and cut to grade. The piling is of eastern spruce, 12 to 14 in. in diam., driven with 3 ft. 6 in. centers lengthwise and 5 ft. 6 in. centers crosswise. These piles were driven from 28 to 40 ft. deep, thus making a good solid foundation for the ways.

The engine house is 36 x 50 x 20 ft. high and in it is installed a 200-h.p. cross-compound engine. This drives a massive train of gear wheels. The largest of these



*Set Up.* *Released.*

**Fig. 4.—Patent Bilge Blocks.**

wheels is 13 ft. in diam. and has a 16-in. face. This was made in one solid casting and weighs 16 tons. This wheel can be seen in Fig. 5. The hauling-out gear is secured to a solid foundation of concrete and iron bed plates resting on clusters of piling. The maximum amount of pull that can be exerted on the cradle with this mechanism is 400 short tons. There are four heavy steel chains attached to the cradle; these have links made of 2½-in. iron. After passing over the chain wheels they take a course as shown in the chain diagram, seen in Fig. 1. The manner of hauling a vessel out with this type of dock is as follows: The cradle is let down, the vessel is then floated over the cradle and its bow run into the centering "bootjack"; this is located on the forward end of the cradle and is shown in the general outline sketch, Fig. 1. The vessel is secured to the docking platform by means of the usual lines and tackle, then the cradle is gradually hauled up; at the same time the bilge blocks are being worked from the docking platforms, these run up against the vessel's bilge and center her on the keel blocks. When a vessel is once blocked in position it takes but a short time to haul her out. The steamship "Westburn," a vessel of 3,320 tons, and having a length of some 350 ft., was hauled out on this railway in 29 minutes, a remarkably short time, as all those familiar with docking vessels can appreciate.

Messrs. H. I. Crandall & Sons are prepared to design these railroads for any capacity of load, and are at present constructing a dock of double the capacity of the one just described. This dock is being built in California and will be of both timber and steel construction.

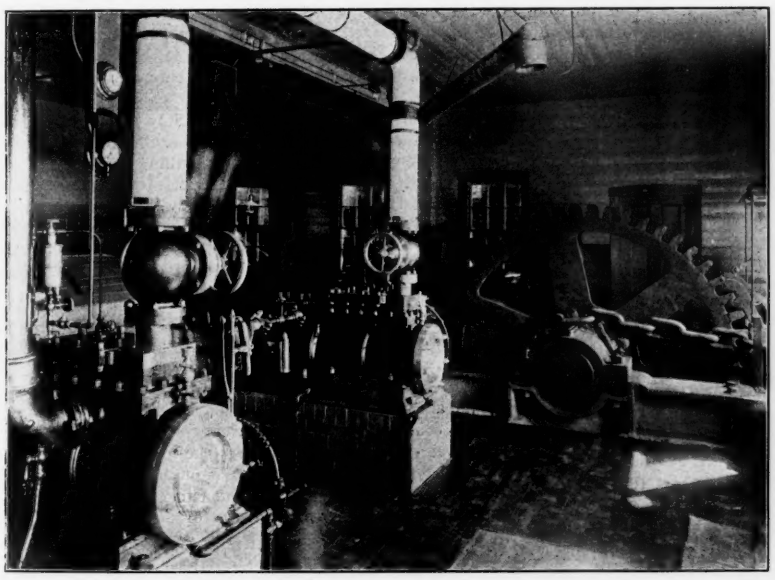


**Fig. 5.—Engine and Hauling-Out Gear.**

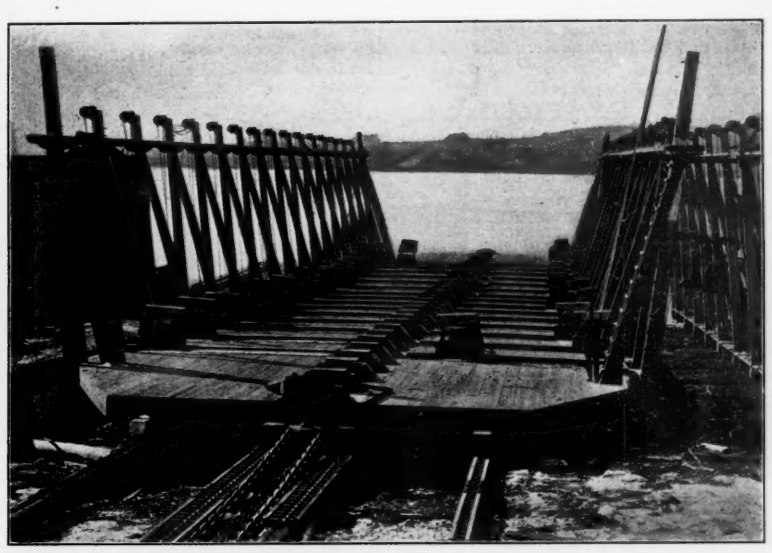


**Fig. 6.—Cradle of Marine Railroad.**

## Some Bridge Accidents.

We printed May 3 (page 297) an account of a bridge accident which took place on a southern railroad as described by Mr. Aylett before the American Society of Civil Engineers. This was contributed as a discussion of the paper on "Some Peculiar Railroad Bridge Accidents" written by Mr. J. I. Boggs, which appeared in the November issue of the *Proceedings* of the Society. The greater part of that paper is reprinted below, together with the discussion by Mr. Joseph Mayer, which appeared in the January issue.

By Mr. Boggs.—Several years ago, while the writer was Division Engineer of Maintenance of Way on the Houston & Texas Central, two or three accidents happened to the bridging under his charge, which may possibly be of some historical interest.

The first bridge, a pin-connected Pratt truss over Richland Creek, of 128 ft. 7½ in. span, was built by the Phoenix Bridge Company, in the early part of 1887, and the posts and upper chords consisted of the old closed Phoenix columns, set into castings at the panel points. The structure was at the foot of a stiff grade, and while a heavy freight train, moving fast, was passing, a bale of cotton became dislodged and was hurled against the first post with sufficient force to bend it 13 in. out of line and knock it clear of the structure, thus leaving the truss with one of its main members missing.

At the time of the accident the structure was entirely covered by the train, weighing approximately 2,500 lbs. per lineal foot. The bridge carried the remainder of the train, consisting of about 20 loaded cars, across in safety, although the main post was gone.

That there was a tremendous bending moment in the upper chord was shown by the following: As quickly as possible a 12 x 12-in. stick of timber, cut to accurate height, was fitted between the upper and lower castings, and a train allowed to pass; as soon as this train had crossed, it was found that the ends of the timber were so badly crushed that it was unfit for further service. A piece of ½-in. plate iron was then inserted between the castings and the timber. This did good service and continued in use until the original member had been taken to the shops, thoroughly repaired and replaced.

In the case of the Navasota River Bridge, a similar structure, of 157 ft. 6 in. span, two posts—one in the left, and the other in the right-hand trusses—were likewise destroyed by two bales of cotton falling off the same train in opposite directions. Again the train crossed safely, the same steps were taken and the posts were repaired and replaced.

In both cases the bridges were floored with 8 x 10-in. ties, spaced at 16-in. centers, and had 56-lb. rails.

There was another interesting occurrence at the Trinity River Bridge, a very light Whipple truss, of 130 ft. span, with panel lengths of 12 ft. 6 in., built in 1877 by the same company. The floor beams were only 20 in. in depth, and the track stringers 7 x 14-in. wooden beams, packed three under each rail. In this instance part of a carload of lumber fell off and struck the first post, permanently bending it about 10 in. out of the vertical. Several very heavy trains, both freight and passenger, with engines weighing 105 tons, passed over the bridge before the accident to the post was discovered.

The Richland Creek and Navasota River cases are interesting from the fact that it has sometimes been argued that no Pratt truss bridge would stand up under these conditions, and the writer very much doubts if it would if the connections were all rigid. If it did stand it is quite likely that the structure would be so disturbed that a good portion, if not all, would have to be replaced, and this would also probably apply in the case of the floor beam riveted to the post above the chord.

The American pin-connected truss has become famous the world over, and why American engineers should now incline to the rigid connections of their foreign brethren is, to say the least, remarkable. In the case of the pin-connected truss, where the load to be transmitted is 50,000 lbs., it is known that it must enter the pin, and the pin be designed accordingly, but in the rigid connection, with, say, a shear of 5,000 lbs., we find 10 rivets, two are thrown in for good measure, making 12 all told; these are distributed two, three, two, and so on. Now, how is the 5,000 lbs. distributed? Does each rivet carry an equal portion, or do the first five rivets take the greater part of the stress, producing secondary stresses which will eventually destroy the usefulness of the structure at a much earlier date than would the old pin-connected? At the hazard of being considered ancient, the writer has ventured on the above remarks, and, while not decrying modern methods, he is inclined to the opinion, that there was considerable inherent merit in the designs of our great predecessors, and that the design of later bridges can be seriously questioned; and as the former has stood the test of time, he thinks that it might be as well to hesitate somewhat before venturing too far into new fields.

By Mr. Mayer.—The pin-connected bridges described in the paper had a remarkable experience, and behaved certainly much better than their most enthusiastic advocate would venture to hope.

It is a curious fact that, while rigid connections are becoming the fashion in this country, they are abandoning them in Germany. The Rhein Bridge, in Worms, is an instance where, for the purpose of avoiding the secondary strains due to the loading of one track only, and the consequent larger deflection of one truss, the floor is freely suspended from the trusses above. The top struts are practically hinged, and there are no intermediate vibration bracings. The stringers have sliding connections to the floor beams to prevent the bending of the latter.

It cannot well be doubted that the secondary strains, which are very large in some members, like end suspenders and vertical posts with floor beams riveted between, could be largely reduced or altogether avoided by such connections. The speaker believes that the movement against hinges which is now in vogue in this country will be abandoned after trial and experience of the large secondary strains caused thereby.

## Management of Freight Trains and Freight Houses.*

Freight should be divided into three classes: (1) fast; (2) common through; (3) local. Probably 30 per cent. of the total freight traffic of this country is handled in fast trains. Increasing the speed increases the cost very rapidly, as has been shown by Mr. McHenry, of the Northern Pacific; hence the management of fast trains and questions affecting the cost of moving them should receive close attention.

The schedule must be slow enough to be regularly adhered to; the tonnage limit should be carefully adjusted to the capacity of the engine, with due allowance for increased friction with long trains; commodities not entitled to fast time should be kept out of such trains, except when ordered by the proper officer; advance information should be received from and sent to connecting lines to avoid delays at junctions. These telegrams should show the number of cars, contents, origin and destination of same, and full information in regard to icing and ventilating, and in the case of stock shipments, time when loaded, and last fed and watered. Each line should agree to make such freight the matter of quick switching movements.

Fast freight trains should do no local work, except at junctions with other roads. If a car breaks down, every effort should be made to take it to a terminal instead of leaving it where the repair man will have to make a journey to reach it. Sometimes the train should be delayed for repairs to a car. Icing stations should be at terminals where engines are changed. Special care should be taken with perishable freight. In ordinary freight cars perishable freight can be shipped safely when the temperature of the outside atmosphere is at + 20 deg. F., and in refrigerator cars when it is at + 10 deg. F. In refrigerator cars, perishable goods can be safely transported when the outside temperature is — 10 deg. F., provided the car is properly heated when loaded, and at the end of the journey the contents are not long exposed to a low temperature. The better refrigerator cars have been tested to handle safely perishable goods when the outside temperature is — 20 deg. F., and the length of

*Abstract of a paper by L. C. Fritch, Superintendent of the Baltimore & Ohio Southwestern.

time in transit does not exceed two or three days. In ordinary refrigerator cars, however, a temperature of 0 deg. F. is considered dangerous for extremely perishable commodities. During seasons of high temperature fresh beef should be chilled to a temperature of + 36 deg. F., and the cars should be brought to the same temperature when loaded, and maintained at a uniform temperature while in transit.

The time-table should have enough fast schedules to handle the minimum volume of business, but not so many that schedules will have to be annulled when business is dull.

Common through freight makes up probably 50 per cent. of the entire tonnage moved. Engines must be worked to their maximum efficiency else there is a direct loss. Whether the economical maximum rating is a trainload representing every ton which the power is capable of handling, rendering the speed slow, the time on the road correspondingly long, and the fuel consumption and train service expenses large, or is a train rating some per cent. of the total efficiency of the power, rendering the movement more rapid, the fuel item and train service charge less, is a question upon which there is no positive agreement. This is one of the problems of transportation which should be speedily solved, as it is one of the most vital questions confronting the operating official to-day.

The best way to rate locomotives is to make tests with a dynamometer; and the next best is to compute the efficiency of each type of engine over each grade. This is better than to use test trains, with which the conditions will vary. Yardmasters and conductors should be held to strict accountability for always fully loading the engines, and it is important that cars be always loaded full. Through freights should handle only through business. Where cars have to be set off at the head of a grade to be taken along by another train, a close watch should be kept for delays and a report should be required every 12 hours, showing loads on hand and time detained.

Common through freight trains should be run on schedules one way and as extra trains the other way.

Local freight trains should be of the same class as common through freight trains.

There is a difference of opinion as to making up trains. In the most generally prevailing practice, live stock is put at the head of the train; oil, spirits and explosives in the middle, with five cars of other freight ahead and the same behind; empty platform cars just ahead of the caboose; loaded cars preferably at the head of train and empty cars at the rear. Car doors should always be closed, to reduce wind pressure and to discourage tramps.

*Stations.*—Where the business is large enough there should be separate inbound and outbound freight houses. The outbound house should be not over 30 ft. wide. To facilitate placing cars on parallel tracks, there should be a platform 7 or 8 ft. wide between each two tracks; then cars do not have to be placed exactly opposite the doors. This saves much time in setting the cars and in getting them out. There should be scales in the house every 50 to 100 ft. The beams should be parallel with and against the wall of the building. On the delivery side of the house there should be conspicuous signs showing what freight is received at the respective doors; and the doors should be numbered. The cars for the various points of loading should be placarded, and should be placed on the particular track opposite the point at which freight for such point is received. If a series of tracks is used with island platforms between the cars on track, one may be prefixed with the figure 1, those on track two by the figure 2 with hyphen between, followed by the order number of the car on track, counting from one end of house. Thus, 1-10 indicates car 10 on track No. 1, and is for New York loading. A painted sign-board 1-10 is hung on this car, and all trucks containing freight for this car are marked in crayon 1-10. The trucker is required to go into car 1-10 and take from a hook hung inside the car one of the checks marked 1-10, and return with it to the checker who loaded his truck. He hands this to the checker, it is marked off, and thus an absolute check is secured, that the freight has been loaded into the proper car.

The inbound house should be wider, say 60 to 80 ft. An ideal arrangement is obtained if the outbound house is located along a driveway with the tracks on the side of house opposite the driveway, the tracks being sufficient in number to accommodate maximum business, the island platform being placed between each pair of tracks. Adjoining the tracks on opposite side of yard, to be located the inbound house, with usually a driveway on the farther side of inbound house. It will be seen that this arrangement is flexible, giving an opportunity of utilizing all the tracks for either loading out cars through outbound house, or for unloading cars through inbound house.

The period of greatest activity in the inbound house occurs in the early part of the day, and in the outbound house in the latter part of the day, therefore the tracks are utilized to their utmost by this arrangement. Scales may be provided less frequently in inbound houses, than in outbound houses in proportion of about one to two. Convenient check clerk offices for checking inbound freight should be disposed throughout the building.

Extension electric lights should be provided in both inbound and outbound houses so arranged as to permit lights to be carried into cars to be used on dark and short days.

A freight house should have special trucks with low wheels for pianos and other bulky articles. Quick-acting jacks are very useful in putting rollers or trucks under heavy articles.

To check freight taken from the cars use rubber stamps giving the railroad, initial, car number and date. This stamp is used on every article of freight in the car, being stamped before being removed. This promptly identifies each shipment by car number and date of receipt. The expense of a full set of stamps for a large freight house is small.

Strong boiler plate iron bridges should be used between platforms and cars. They should be slightly curved with convex side up to prevent slipping. A strip of iron ¼ in. thick and 1½ to 2 in. wide, placed parallel with and about 12 in. inside the edge of platforms, forms a suitable rest for bridges, and prevents their slipping, and obviates the necessity of driving nails into platform to keep bridge in proper place. The checking of inbound house freight should be by the use of a blind tally, everything being checked out of car as unloaded, and tally sheets sent to freight office for check with way-bill.

Reports of freight over, short, and damaged should be made daily, but should be sent to freight claim department weekly; this department should make a summary of such reports and send a copy to each station. This saves much tracing.

Care should be taken not to burden freight houses with carload freight. The freight office should have a fireproof vault for its records; loss of such records has been the cause of much expense. Team tracks should be laid in pairs and the driveways between each two pairs should be wide enough to allow a roadway when a wagon is backed up to a car on one side.

For transferring cotton, tobacco and other bulky packages, platforms 10 to 12 ft. wide should be provided. For transferring grain, one track should be 5 ft. 6 in. lower than the other, and these tracks should not be over 10 ft. 6 in. apart, center to center. For transferring heavy machinery, there should be an overhead traveling crane; for loading to and from a wagon, a revolving crane should be provided.

## Railroads in the Soudan.

The railroad line from Wady Halfa was completed to Halfaya on the Blue Nile opposite to Khartoum on the 30th December, 1899. These points should be borne in mind:

1. The line was laid primarily to supply an army in the field. The route, method and material were all chosen with this object in view.

2. Nearly 50 per cent. of the line is in absolute desert. This part is never likely to earn any revenue, but requires maintenance as much as the rest of the line.

3. Every train leaving Halfa for Khartoum has to carry with it 9,500 gallons of water for the engine.

4. All soldiers, Government officials, Government supplies, and stores have to be carried free, and, in addition, it is necessary to grant a considerable number of free passes.

5. The goods traffic at present from south to north is inconsiderable, but this is increasing. There is, however, a fair amount of date traffic during the closing months of the year on the Kerma line. In the coming year it is calculated a large quantity of gum from Kordofan and other parts will be exported from the Soudan. A certain quantity of wheat is transported from the Dongola district to Khartoum for consumption of the troops.

6. Every effort is being made, by obtaining articles locally, to reduce the amount of building material, stores and supplies, etc., required for army consumption, reconstruction and other objects, thus freeing more rolling stock for the transport of private merchandise, and it is hoped that in the coming year, with the additional rolling stock now ordered, more accommodation for paying goods will be available than it has been hitherto possible to provide. There are 779 miles of line now open in the Soudan:

| | |
|---|---|
| The total receipts from passenger traffic amount to. | £6,703 |
| (a) Value of free passes issued to officers, soldiers, Government officials and their families.... | 48,788 |
| (b) To other civilians..... | 6,093 |
| Total receipts from goods traffic, live-stock, etc.... | 27,555 |
| Value of freight on materials carried for railway.... | 16,944 |
| Value of freight on Government building materials, stores, supplies, etc., which have at present to be carried free (assuming them to have been carried at an uniform rate P. T. 10 per kantar).... | 40,468 |
| Gross earnings ..... | £146,551 |
| From this must be deducted the value of free passes to certain passengers and goods carried free, which amounts to ..... | 112,293 |
| Leaving the actual earnings..... | £34,258 |
| Total working expenses (not including new works).. | 113,350 |
| Percentage of working expenses to gross earnings.. | 77 |

A total of 728 trains (up and down) on the Khartoum line have been run during the year, amounting to 419,440 train miles. And on the Kerma line a total of 348 trains, amounting to 70,560 train miles.

The working expenses per train mile:

| | |
|---|---|
| On the Kerma line..... | 5s. 0¾d. |
| On the Khartoum line..... | 4s. 5½d. |

It will be seen from the above that if a reasonable charge were made for all government materials and passengers, the line as a whole would show a fair margin of profit. It is anticipated that improved accommodation for tourists will be provided for the winter season 1901-1902.

## The Turbine Steamboat, King Edward.

The "King Edward," the latest Clyde passenger steamboat, built for the purpose of trying the Parsons' steam turbine machinery for mercantile purposes, has quite justified the courage and enterprise of her owners.

The "King Edward" is 250 ft. long and 30 ft. wide. Her molded depth is 10 ft. 6 in. to the main deck and 17 ft. 9 in. to the promenade deck. The propelling machinery consists of three Parsons' steam turbines working compound. These are placed side by side. In ordinary working, and when going ahead, steam is admitted from the boilers to the high-pressure turbine, where it is expanded fivefold. From thence it passes to the two low-pressure or wing turbines placed one on each side, where it is expanded 25-fold and then passes to the condensers. The total ratio of expansion is therefore no less than 125-fold. Each turbine has its own shafting, and on each of the wing shafts there are two propellers, while the center one carries only a single screw. When coming alongside a pier or maneuvering in crowded waters the wing motors alone are used, steam being admitted directly into them by suitable valves. The high-pressure turbine is then shut off, the steam-admission valve being closed, while connection between it and the low-pressure turbines is also shut off by an automatic arrangement. There are special turbines placed inside the exhaust ends of the low-pressure turbines for going astern with the wing screws. The whole of the maneuvering excepting, of course, by the rudder, is effected by the manipulation of valves in a very simple manner.

On June 26, on a mean of runs over the Skelmorlie mile, a speed of 20.48 knots was registered. The mean revolutions were 740 per minute, the steam at the boilers was 150 lbs. to the square inch, and the vacuum 26½ in. The air pressure in the stokehold was equal to 1 in. of water. The indicated horse-power was estimated at 3,500, there being, of course, no means of taking indicator diagrams with this type of motor.

The weight of the motors, condensers, with water in them, steam pipes, auxiliaries connected with the propelling machinery, shafting, propellers, etc., is 66 tons. This, we believe, is considered to be about half the weight per indicated horse-power developed of the average of the propelliing machinery of paddle-boats of a similar type. So far as the turbines are concerned, it is not possible to tell whether they are running or not by placing one's hand on them. There is, however, a very slight vibration that can be felt right astern, and this is due to the propellers. Whether this can be eliminated or not remains to be seen, but certainly no vibration is set up by the main engines themselves. At the bow end motion is similar to that of a fast sailing yacht.

In regard to the fine shape of the boat, it may be pointed out that the low center of gravity of the turbine machinery gives good stability without the necessity for a hard bilge or long floor; in fact, this type of machinery lends itself readily to a form of hull conducive to high speed.—*Engineering* (*London*).

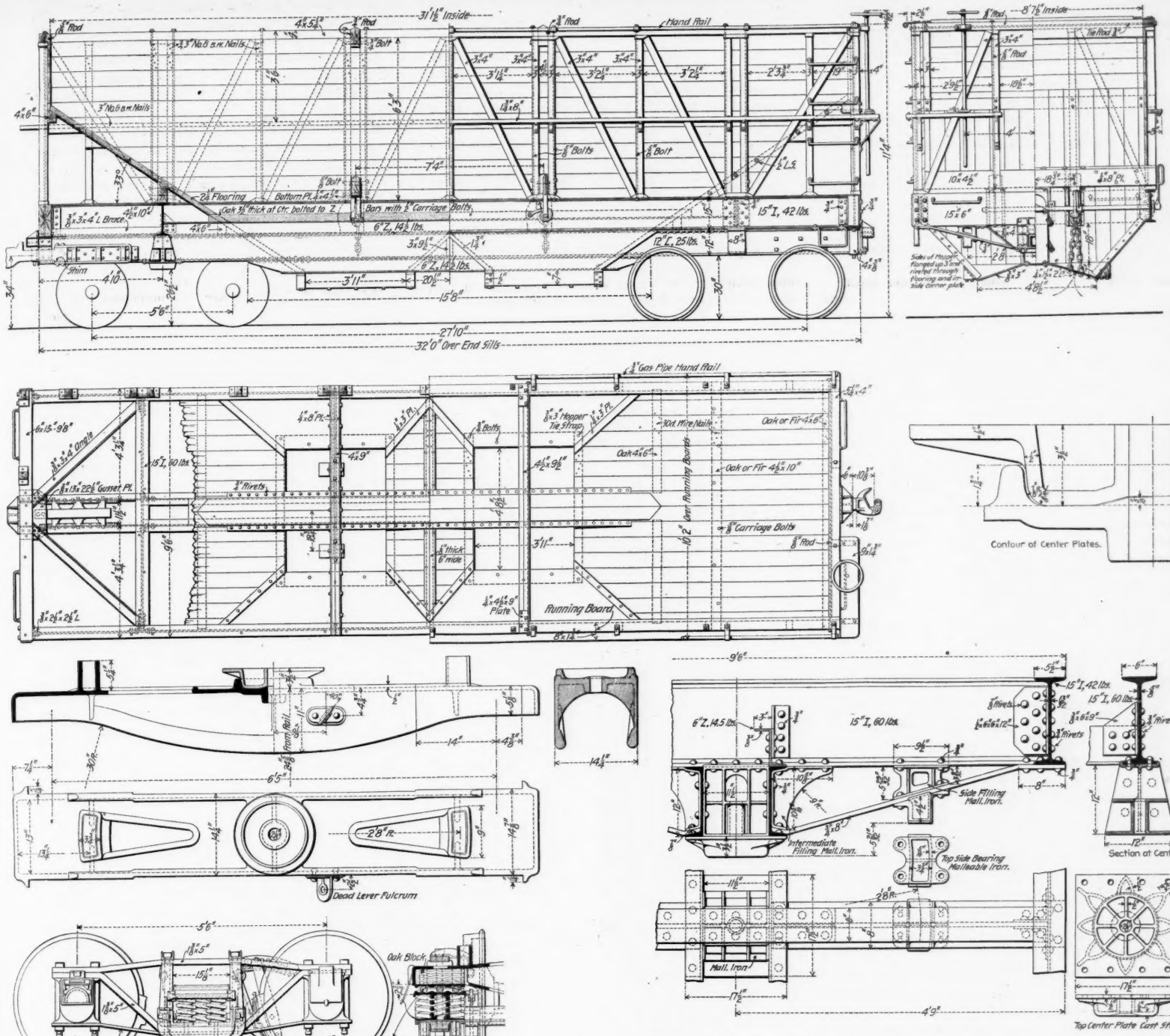
## 50-Ton Twin-Hopper Car With Rolled Steel Underframe—Northern Pacific.

The accompanying illustrations are of a 32-ft. twin-hopper coal car of 100,000 lbs. capacity with rolled steel underframe and wooden upperstructure, of which the American Car & Foundry Co. is building 450 for the Northern Pacific. We are indebted to Mr. Alfred Lovell, Superintendent of Motive Power, for drawings and specifications.

The length of the car over end sills is 32 ft., the width over side sills is 9 ft. 6 in., and the height from the rail to the top of plate is 11 ft. 4 in. The center sills are 12-in. soft steel channels weighing 25 lbs. per ft., reinforced at the top and bottom with ⅜ x 6-in., 14½-lb. soft steel Z-bars. The top bar extends the full length between the body bolsters in one piece and is secured to the top flanges of the channel with ¾-in. rivets spaced not over 4 in. apart. Each end of the top bar is secured to the web of the body bolster with a ⅜ x 3 x 6-in. angle riveted to the bolster with four ¾-in. rivets and to the Z-bar with four ¾-in. rivets. The bottom Z-bar is 15 ft. 8 in. long and otherwise of the same weight and dimensions as the top bar, and is riveted to the bottom of the channels with the same size rivets and spacing as the top bar. The outer ends of the center channels have a ⅜ x 13 x 22½-in. gusset plate riveted to the top flanges of the channels. The center sills are continuous throughout the car and the body bolsters are also continuous, being carried above the center sills.

The side sills are soft steel 15-in. I-beams, weighing 42 lbs. per ft., each end being fitted with two ⅜ x 2½ x 2½ x 12-in. corner angles, which are riveted to the web of the beam. The end sills are of yellow pine, 6 in. thick x 15 in. deep, fastened at the center with two ¾-in. bolts, which pass through the gusset plate and top flange of the buffer, and two ¾-in. bolts which pass through the gusset plates. The end sills are bolted to the angles on the side sills with six ¾-in. bolts, washers being used where they bear on the wood. Each body bolster is a 15-in., 60-lb. soft steel I-beam, the outer ends being fitted between the flanges of the side sills and secured to them with ½ x 6-in. angles; each angle being riveted to the web of the side sill with five ¾-in. rivets and to the web of the body bolster with seven ⅞-in. rivets.

Each end of the car has two diagonal braces made of soft steel angles, ⅜ x 3 x 4 in., secured at each end with




**50-Ton Twin-Hopper Car With Rolled Steel Underframe—Northern Pacific Railway.**

three ¾-in. rivets. The buffer blocks are of malleable iron riveted to the web of each channel and bolted to the end sills. The draft rigging used is the Northern Pacific standard with tandem springs, the spindle and followers being of soft steel and the caps and casings of malleable iron. The casings are secured to the channels by six ¾-in. through bolts. The drawbar yoke is of soft steel, 1 x 4 in., riveted to the coupler with 1⅛-in. rivets and a ⅜-in. shim is used between the yoke and coupler to give more vertical motion. Tower couplers are used with top unlocking device.

The posts, braces, crossbeams over the center of hoppers and the side plate tie beams are of white oak. These and other members are shown by the engravings. The hopper openings are 2 ft. wide and 3 ft. 11 in. long, the ends of the hopper openings being made of triangular pieces of oak 3 in. thick and held in position by ⅜ x 3-in. soft steel straps. These straps are riveted to the side-sheets of the hopper and to the lower flanges of the Z-bar in the center, and the ends of the inclined flooring are nailed and bolted to the triangular pieces, as shown in the drawings. The sides and doors of the hoppers are of ¼-in. steel plates and the top of the Z-bars, forming the center ridge, is covered with oak bolted to the upper flanges. The doors are operated by chains and winding shafts.

The trucks were designed especially for these cars, are of 100,000 lbs. capacity and are in accordance with Northern Pacific standards. The cast steel truck bolster is shown separately. The bolsters are strong enough to carry the weight of the loaded car without deflection, and it is intended that the clearance between the side bearings shall not be less than ¼ in. nor more than ⅜ in. The roller bearings of the bolster are of rolled steel, 2 in. in diam., and the roller caps and seats, as well as the spring seats, columns and brake hanger brackets, are of malleable iron. The axles are of steel, railroad company's specifications, with journals 5½ x 10 in., a wheel fit of 6⅞ in. and a diameter 5⅞ in. at the center of the axle. The wheels are 33 in. in diam. and weigh 700 lbs. each and are put on at a pressure of 45 tons. The bolster springs are in groups of five, the free height being 6¾ in. and the solid height 5.17 in. The capacity of each single coil is 16,000 lbs. Inside-hung metal brake-beams are used. The cars have Westinghouse brakes and 15-lbs. pressure retaining valves.

## Miller's Signal on the Chicago & Eastern Illinois.

According to the *Chicago Inter-Ocean* the Chicago & Eastern Illinois has decided to equip thirty-three miles of its line, double-track, with the Miller Automatic Block Signal. The road has had an experimental installation of this apparatus in use for about a year. The 33 miles is from Momence northward toward Chicago.

The Miller Signal consists of an electric light, burning in the cab of the locomotive, the light being maintained by a battery carried on the engine, controlled by circuit from a local battery fixed at the side of the road, which in turn is controlled by a track circuit, as in the case of other automatic block signals.

In the cab are two incandescent lamps, one showing white, which indicates a clear block section, and the other, showing red, indicating that the block controlling it is occupied. One or the other is always aglow. As the signal is necessarily a caution signal, a line wire strung upon poles is used to convey the indication back the length of one block section so as to give enginemen in all cases space enough to stop. To enable connection to be made between the battery at the side of the road, and the apparatus on the engine, the front truck of the locomotive is insulated from the rest of the engine, and one rail is insulated at the entrance of each block section.

We have not been favored with a diagram of the electric circuits, but from a letter received from an officer of the road we are able to give the following additional details.

The track is bonded and divided into circuit sections the same as in any track circuit signal installation. At the beginning of each section there is what is termed a "station," which is the point at which the indication is conveyed to the locomotive, to be carried through to the next station. The "station" consists simply of an insulated rail, a track battery for the section in the rear, a track relay for the section ahead, a station relay which is controlled by the track relays of the two sections in advance, and a battery which is not only connected to the insulated rail, but is the source of energy in the circuit of the station relay in the rear. Between stations there is one line wire, one of the rails of the track being used for the return portion of the station relay circuit.

The lamps in the cab are operated by a battery (8 cells Edison-Lalande), which is carried on the engine, and are controlled by a special form of relay, which is worked from the station battery through the station relay as a medium, when the engine passes over the insulated rail, the front truck of the engine being insulated from the frame for this purpose.

Polarized relays are used on the engine. One or the other of the incandescent lamps is always burning. If a locomotive in passing station A gets a clear signal, it carries a white light to station B; and if it gets a red signal, it would prepare to stop at B.

RAILROAD GAZETTE

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## EDITORIAL ANNOUNCEMENTS.

*CONTRIBUTIONS—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

*ADVERTISEMENTS—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and these only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.*

On Tuesday of this week the President of the Amalgamated Association of Steel Workers ordered strikes in the mills of the National Steel Co., the National Tube Co. and the Federal Steel Co., these to begin Saturday night, Aug. 10. We make no prediction as to the importance or extent or duration of this new phase of the steel strike. In writing July 19, we said: "How far the strike now begun will extend, no man can say. At this moment we venture the guess that it will extend a good deal further than it has yet gone, and we make the further guess that the end of it will be the complete defeat of the men." Of this outcome we still have no doubt. The principles in contention remain the same, namely, the right of men to work without joining unions and the right of owners to manage their own business. The destruction of these fundamental rights is all that the leaders of this strike aim at, and we cannot believe that Americans are yet ready to permit these rights to be destroyed. In Mr. Shaffer's letter to the men announcing the extension of the strike, he says: "You will be told that you have signed contracts, but you never agreed to surrender those contracts to the United States Steel Corporation. Its officers think you were sold to them, just as the mills were, contracts and all. Remember, before you agreed to any contract you took an obligation to the Amalgamated Association." It is astonishing to see a man of his intelligence address men of the intelligence of skilled steel workers in such foolish language. Of course he knows, and they know, that nobody thinks for a moment that they were sold with the mills. Furthermore, he knows, and they know, that a decent respect for contracts is the basis of the existence of business. If the obligation of the men to the Amalgamated Association vitiates any other contract which they may make, of course the existence of the Amalgamated Association makes organized business impossible, when the matter is carried to its logical and inevitable conclusion. It follows, further, that no association occupying such an absurd position can endure a great while; otherwise, society could not endure.

### The Brooklyn Bridge.

Concerning the Brooklyn Bridge and the broken suspender rods it is probably not worth while to express any opinion until the evidence is all in. Any judgment not based on all the facts would be, to say the least, dangerous. But so far as we have information two or three things seem tolerably certain.

The design and workmanship of the hangers or trunnion bearings by which the suspender rods are connected to the floor beams is unfortunate in at least two particulars. (See *Railroad Gazette*, Aug. 2, page 546.) The hangers do not provide for lateral movement, or for the tipping of the floor when the load on the north and south sides of the bridge differs greatly. There is a good chance for the trunnions to stick fast with rust or dirt or both, and to bring bending strains on the rods. The actual condition of these trunnions is hard to detect in service, and, further, the ends of broken rods are hidden from sight and breaks are not at once revealed to the view of the inspector. It is not worth while to inquire now into the responsibility for this design or to inquire if anything better was ever suggested, or even if the inherent faults of these hangers were ever suspected before the rods broke. All of this is history which it would be idle now to rake up. It is interesting, however, to learn that all of the trunnions taken out the other day were bright, showing motion.

It seems apparent now that the inspection of the details of the bridge has not been as efficient as it might have been. That, however, may be the subject of an official inquiry and then we may hear more about the matter. In a published interview the Superintendent of the Bridge said: "Our inspection may have been defective or it may not. That is a matter of opinion. But we all learn from experience and we have now had our experience on the bridge." We are quoting from memory and may not give the precise words of the interview, but we think that we have not distorted the sense. If everybody having official connection with this affair had been as candid the situation would now have been much more agreeable for all hands.

It seems at least proper to say here that if there have been defects in the inspection and care of the bridge the Department of Bridges cannot be fairly charged with such defects. In recent times, at least, the executive officers of the bridge have had all the powers necessary for proper care of the structure. Of course, the head of the department must be held responsible for the efficiency of his chief officers, but nobody can criticise him for retaining in office the men who for years past administered the affairs of the bridge with singular fidelity and efficiency.

When all is said, engineers, writers for the press and the public should not forget in a time of excitement and trouble the extraordinary and indeed unprecedented work which the executive officers of the bridge have done in the past and are still doing. On the two sets of railroads, namely, the bridge railroad and the trolley, close to one hundred million passengers are handled in a year, and these have to be handled to and from one terminal point at each end of the bridge. We think it is true that the next most crowded terminal in the world, namely, the Liverpool Street Station of the Great Eastern Railway in London, handles less than half of this number of passengers. Of course, traffic has grown from year to year so rapidly that it has always been ahead of the facilities, and this, perhaps, will always be true. But within the physical limits which have surrounded the work of the administrative officers of the bridge they have performed a service in transportation that any set of men would be proud of.

### The Public and the Railroads.

That the public may rightfully dictate how its railroads shall be run, is a proposition that needs no support by argument; but that the public will ever learn how to enforce its wishes in a rational manner is an assertion which only the boldest would dare to make. We have lately had two examples which illustrate the blind way in which public-spirited citizens go to work to cure unsatisfactory conditions in the railroad world; one in Alabama and the other in New York; and they cause one to wonder whether people will ever develop the art of government sufficiently to accomplish their objects in any other way than by blundering into the right path after all possible wrong paths have been tried.

In Alabama a convention is sitting to revise the constitution of the state, and one of the things under discussion is the status of the railroad commission. Various plans for making that body more serviceable have been proposed, the most popular one being that for having the three members elected by the people and "paid by the people," instead of having them appointed by the Governor. It is charged that the commissioners, being "paid by the railroads" are subservient to them. If we may judge by the newspaper reports the people of Birmingham are so anxious for a change that they are going to lay their appeal, either by addresses or circular, before the people of every important town in the state. The Freight Bureau of that city is publishing long arguments in the newspapers, and has sent a petition to the constitutional convention.

The noticeable thing about this agitation is the adoption of a retrograde movement in the apparent belief that it is a progressive one; and the failure to see the real point at issue. Commissioners elected by the people are likely to be less efficient than those appointed by the Governor, rather than more so, if we may judge by the results in other states. Geographical considerations become unduly prominent and the likelihood of getting competent men of strong character is much lessened. We may admit, for the moment, that the people ought to have for commissioners men who would rule the railroads with an iron hand; but nominating conventions, instead of exercising calm judgment and hunting for persons with native abilities and business qualifications which would promise the desired result, are more likely to choose the men who are most liked by the voters; and voters' likes usually depend on other than the best business qualities. The question about the payment of the commissioners' salaries and expenses is a fallacious issue. It is true that these payments ought to come out of the general fund of the state; but, nevertheless, some of the most efficient and independent commissions in the country are paid out of a fund raised by direct assessment on the railroads. Such special taxation is, indeed, illogical; and to make the railroads transport commissioners free is still more childish; but commissioners who are influenced by such considerations would be easily influenced by something else if these were not present.

The real desideratum in Alabama appears to be to get commissioners of broad minds and judicial temperament who can examine transportation questions with thoroughness and then make them plain to the people. The Birmingham Freight Bureau alleges that in the matter of freight rates the railroads treat Alabama unfairly as compared with the way they treat Georgia; and that the commissioners do not tackle the problem. The problem is, no doubt, a difficult one. Quite likely the wisest commission, if it got at all the facts, would have difficulty in deciding what to do. It might have to tell the people to wait some time for the redress of their grievances. In such a situation one of the most important qualifications of a commission is to be able to convince the people of the soundness of its own position; and to get a commission thus qualified, a popular election is the last method to be chosen.

The other case to which we refer is the agitation in New York city for the abatement of the smoke nuisance in the tunnel through which the New York Central and the New Haven roads reach the Grand Central Station. On the very hot days which occurred in the first half of July many of the passengers who rode through the tunnel, in cars which had all their ventilators and other openings tightly closed, found the atmosphere pretty stifling; and, of course, the newspapers, all of which were giving liberal space to "news" about the weather, discussed at length what the oppressed passengers had to say. The discussion was kept up from day to day, and, the hot weather continuing, the district attorney of the county laid the matter before the grand jury, with a view to taking criminal action.

The grand jury recommended that the railroad at once abolish the use of steam locomotives in the tunnel and adopt electric motors; and made various other recommendations which we will not discuss now. What we do wish to remark upon is the utterly absurd way in which the people have gone about getting the change that they want. If every public officer having jurisdiction over the tunnel and its management has been appealed to and has failed to do his duty; and if the railroad officers have not given reasonable replies to complaints which have been made to them, it may be that proceedings looking to criminal prosecution are justifiable; but it does not appear that any action whatever has been taken in these other directions. Nobody seems to have said a word to the state railroad commissioners, though that would seem to be the first public authority that anybody would think of appealing to.

Unless the public authorities are ready to begin a vigorous prosecution to annul the charter of the railroad for not carrying its passengers in decent comfort, it would seem that the statutes under which the Board of Health acts must be the basis of any action taken; but the newspaper agitators do not seem to be doing much with that body. If one considers the problem from the standpoint of the Board of Health, he at once sees the enormous difficulty of dealing with it; and perhaps that is the reason why the complainants continue to beat their tom-toms instead of adducing rational arguments. If the Board of Health should proceed to drive the smoke out of the tunnel it would encounter complaints from the people who live in the houses above the tunnel in Park avenue; and if it should abolish smoke by introducing electric motors, it would probably kill some workmen (if not passengers) among the very complicated and crowded tracks of the yard and station. If it should order any useful change whatever, it might entail such a bill of costs that the railroad

would have good reason for asking to be relieved of its charter obligations and to be permitted to make its terminus north of the tunnel.

As before intimated, however, we do not bring up this problem at this time for the purpose of discussing ways of solving it, but merely to suggest the waste of effort involved in beginning at the wrong end. At best the problem is one requiring much study and time, as well as money; and that implies the need of putting it in the hands of technical men (such as the railroad commission would naturally entrust it to) rather than those of ordinary citizens like jurymen, or of lawyers who can deal only with specific statutes. Assuming that the railroad is as negligent as its severest critics claim, and that the problem of smokeless motors is as easy as the most cheerful newspaper engineer asserts, still the amelioration of the conditions in the tunnel is a long and tedious task; and a criminal prosecution is the most grotesquely inappropriate means of dealing with it. It is charitable to assume, however, that the newspapers honestly believe that this "news" about the tunnel is what their readers want, and that this want renews itself with great frequency; and we may also assume that the problem of making city officials in NEW YORK do their duty has of late years become so difficult that public officers who really do act in the public interest, or even with that intention, probably feel that they deserve commendation, however abortive their work may prove. But what a waste of energy!

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The Railroad Commissioners of Texas have "run up against" the Governor. In that State the Railroad Commissioners hold the fortunes of all the railroads absolutely in their three pairs of hands; and hitherto this has been pretty satisfactory to the people, though not everybody is satisfied with their rate-making, as we recently had occasion to observe. The Commissioners seem to be courageously striving to maintain perfect equality as between all interests, but this, of course, is an impossible task, and the Governor, it appears, has accused them of neglect of duty in not making low rates on oil shipped from the recently discovered "gushers" in that State. In response to this the Commissioners issued an address to the public, pointing out that the rates on fuel oil between points in Texas are lower than in any other State, and that the Commission had been active in accumulating data on the subject, with a view of readjusting rates if deemed necessary. The address further says:

"Neither in his note to the Commission nor in his speech at Cuero, nor elsewhere, has the Governor assigned one solitary fact in support of his charge. He, perhaps, knows, or ought to know, some of the legal methods to be employed in the ascertainment of what constitutes a reasonable rate. This Commission affects directly and indirectly all the material interests of the State to a much larger extent than any other department of the State government, if not greater than all of them together. We are responsible to the people of Texas for the manner in which we perform our official duties, but not to any other department of the State government." Shippers of coal have protested against the reduction of freight on oil, as a reduction would damage their business. In the northern part of the State where the freight on a barrel of oil from Beaumont raises its cost from 20 cents to 70 cents, the newspapers say that Governor Sayers will have the people behind him in any clash with the Commission. Of course the Commission must not neglect the coal interests; and the question how to be fair to the coal shippers, the oil shippers, the railroads and the consumers waits to be solved. The beautiful harmony which has seemed to prevail among all classes of people in Texas (except between the people and the railroads) for so many years concerning the freight rate law appears likely to be superseded by a situation something like that in Maine over the prohibition of liquor selling, where a good many citizens are said to be "in favor of the law, but agin its enforcement." A law to keep freight rates rigid is a good thing as long as it hurts only the other fellow.

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The annual report on the railroads of India for the year ending Dec. 31, 1900, has recently been issued. Heretofore these reports have covered the fiscal year ending March 31, and also have in certain matters covered a calendar year. The report which is now issued is simplified by bringing it all within the calendar year. During the three years ending with last December, the railroads of India were increased by 3,619 miles open for traffic, bringing the total miles up to 24,707. The passengers carried amounted to 175 millions, being an increase of 8.39 per cent. over the preceding year; of these, 164½ millions were third class passengers. The increase is attributed partly to migrations caused by famine and plague. The freight moved amounted to 44 million tons, an increase of 7.43 per cent. There was an important increase in coal carried amounting to 9½ million tons. The gross earnings amounted to 316 million rupees, and the working expenses to 151 million. The net revenue amounted to 4.99 on the capital outlay. The total capital expenditure on the railroads open and building has been 220 million pounds sterling. The policy is now declared of pushing steadily and fast to completion roads on which building has begun, and it is expected also that there will be a liberal expenditure on rolling stock.

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The newspapers have told us that the Rio Grande Western has gone extensively into tree planting for the purpose of raising cross-tie timber. The fact seems to be that this enterprise is rather for beautifying and protecting the right of way than for raising cross ties. The company bought some 60,000 yearling trees of the Catalpa Speciosa and had them set out in specially prepared land near Provo, Utah, under the charge of a skilled horticulturist. These trees were set out last spring and have grown fast, and not one has died. In the fall, ground will be prepared along the right of way and another spring these trees will be transplanted to points along the line where the land is suitable and where sufficient water can be had. When the trees from the nursery now established have been transplanted, seed will be sown, and it is expected that from year to year the number of trees will be added to, primarily to beautify the depot grounds and the right of way. It does not seem likely that the company will take up, at present at least, so large a matter as the raising of tie timber, and it is highly improbable that trees planted along the right of way to add to its beauty will be cut down for ties.

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There is a prospect of the construction of a new railroad from Moscow nearly straight east, crossing the Volga at Kasan and the Ural Mountains a little north of the present railroad to a connection with the Siberian Railroad at its western terminus—a line about 930 miles long, which will serve as a second western outlet of the Siberian Railroad, the present western Moscow connection of which bends considerably to the south of a straight line. One object of the favoring of this line is said to be to give work to the Russian rolling mills, locomotive and car shops, etc., which have had a hard struggle to live for a year or two; but a company offers to build this line at its own risk. One of the conditions imposed on the company is that it give out contracts immediately for rails and rolling stock.

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## NEW PUBLICATIONS.

*Index to the Proceedings of the American Railway Master Mechanics' Association.* From Vol. I. to XXXIII. inclusive. Compiled by George L. Fowler, under the direction of F. A. Delano, S. P. Bush and C. M. Mendenhall, Committee.

This valuable index, which has already been announced, appears as an octavo of 206 pages. It is a simple alphabetical index, of authors and subjects, and will be of great value to those who have occasion to use the information accumulated in the volumes of the *Proceedings* of the Association. It may be had of the Secretary, Mr. Taylor, The Rookery, Chicago, Ill.

*Transactions of the American Institute of Electrical Engineers.* Vol. 17. R. W. Pope, Secretary, 26 Cortlandt street, New York.

This volume, just issued, contains over 800 pages. It is made up of the proceedings of the meetings held during the year 1900, one of which was held in Paris, in August. The list of members is given alphabetically, with date of admission, and there is another, arranged geographically. Both lists are revised to May 15, 1901. There are three indexes; one of the business of the Institute; one of subjects discussed; and one of authors of papers and participants in discussions.

*Rand, McNally & Co.'s Business Atlas.* Rand, McNally & Co., Chicago. 1901.

The 31st edition of this atlas, for 1901, has just been received. It contains a slightly increased number of pages, owing to the enlargement of several maps. There is a new two-page map of the Chinese Empire much superior to last year's; also a two-page map of Oklahoma and Indian Territory in place of the single-page map in the edition of 1900. The Philippines have two pages in the new edition, in place of half a page in the old, and there are other enlargements and revisions. The population figures are taken from the census of 1900. This is a practical and useful atlas.

*A Handbook for Apprenticed Machinists.* Edited by Oscar J. Beale. Providence, R. I.: Brown & Sharpe Manufacturing Co., 1901. 50 cents.

An experimental edition of this little volume was published a year or two ago and it was found so acceptable that the edition now issued has been enlarged and revised and a considerably larger edition has been printed. The book was designed primarily for learners in the use of machine tools in the shops of the Brown & Sharpe Manufacturing Company, but it will be acceptable to machinist apprentices and young mechanical engineers everywhere. It is not a book of theory or of mathematics, but simply a collection of hints and information as to the care and use of machines, as to the workman's care of himself in using tools, as to reading drawings, measuring, lacing belts, figuring gear speeds, indexing, etc., etc.

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## TRADE CATALOGUES.

*Rail Joints.*—The Continuous Rail Joint Company of America (142 Market street, Newark, N. J.) has issued a fine catalouge showing the application of the Continuous joint to rails of many different weights. The catalogue also shows the Continuous joints as designed for street car service and for insulated joints.

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*Twist Drills, Reamers, Etc.*—The Standard Tool Co., Cleveland, Ohio, and 94 Reade street, New York, sends a new catalogue being a 12mo. volume of 224 pages. This shows the twist drills, reamers, chucks, taps, dies, milling cutters, etc., etc., made by this well known concern. Sizes and prices are given, with other information useful to the buyer and to the engineer.

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*Derrick Fittings.*—The Dobbie Foundry & Machine Co., Niagara Falls, N. Y., have lately issued their catalogue No. 8, showing derricks of various styles made by them; also a comprehensive lot of forgings, castings and other equipment pertaining to derricks and derrick work. Prices and other information are given and the matter is in available form for users of such equipment.

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*The Stow Manufacturing Co.*, Binghamton, N. Y., has issued a new catalogue, No. 9, describing the company's flexible shafts and shop equipment, especially machine tools that can be driven by flexible shafting; and there is a long list of other shop devices, such as belting, boring machines, grinders, shafting, die sinker's tools, drills, electric motors, reaming machines, brushes, and clutches.

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*Messrs. Fairbanks, Morse & Co.*, Franklin and Monroe streets, Chicago, have issued a new Railroad Department catalogue. They ask particular attention to the gasoline engine for pumping, compressing air, hoisting, electric lighting, etc. Also to descriptions of coaling stations, turn-table machinery and the like. The catalouge has 192 pages, and besides the apparatus just mentioned shows the great line of railroad material for which the house is so well known.

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*Engines.*—The B. F. Sturtevant Co.'s catalogue No. 103, just out in its fourth edition, briefly describes their throttling and automatic cut-off engines; illustrates the several types and shows several direct-connected electric generating units of their design and make; gives much useful information about these and other things; and has on the last two of its 50 pages a table of horse power constants that will at times be found convenient. The engines are especially designed for driving dynamos or for similar constant high duty.

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*Niagara Falls Power.*—The Cataract Power & Conduit Company, of Buffalo (40 Court street), has issued a small illustrated pamphlet designed to advertise the business of producing and selling electric current at Niagara Falls. It is a compact account of the commercial distribution of power generated at Niagara Falls. We have somewhat frequent inquiries for information concerning this enterprise and judge that a good many of our readers will be interested to know that such a pamphlet is to be had. It may be obtained gratis from the company as above.

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*Industrial Opportunities* is the title of a little handbook issued by the industrial department of the Delaware, Lackawanna & Western telling of the chances for business in all of the towns and villages along the line of the road. This book has been compiled by Mr. W. B. Hunter, chief of the industrial department, and it appears to have been prepared with a good deal of care. Notes are given of every town on the line, showing population, railroad facilities, leading industries and cost of labor and rents; and information is given about light, water works, power, cost of coal, taxation, vacant lands and factories, etc. Where there are important vacant buildings, or where a town or village is making special efforts to attract new manufacturing enterprises, Mr. Hunter gives detailed information, so that his book constitutes a really valuable free advertisement for the towns interested.

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*The Kilbourne & Jacobs Mfg. Co.*, Columbus, Ohio, has issued three new catalogues: No. 7 (second edition), No. 31 and No. 33. The first named is a 128-page illustrated catalogue and price list of trucks of all kinds, including baggage barrows, warehouse trucks, depot express wagons and push carts. Catalogue No. 31 covers small cars. It has 72 pages of illustrations and descriptions of contractors' dump cars; hand and push cars; steel ore and mine cars and skips; wood and steel platform and yard push cars; rolling mill and sheet metal cars; small cars for foundry and factory uses, etc. Catalogue No. 33 is devoted principally to articles used by contractors. In it are shown a number of styles of drag and wheel scrapers, grading plows, light and heavy dump carts, hand carts and wheelbarrows. The pamphlets give one an idea of the great variety of articles made by this well known concern and those interested would do well to send for copies.

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*The Bettendorf Axle Co.*, 1590 Old Colony Building, Chicago, has issued a catalogue of 50 pages, descriptive of the various designs of I-beam bolsters for freight cars which it is prepared to build at its works at Davenport, Iowa. In these bolsters commercial I sections are used, 8, 9, 10 or 12 in. deep, as may be required. It is said that over 60,000 of these bolsters have been put in service on 40 different railroads during the past five years. The tapering of the ends is now done

wholly by corrugating the web in a hydraulic press, the metal being worked cold. After all parts are assembled, each bolster is tested under a 100-ton hydraulic press. Eleven designs of the Bettendorf bolsters as used by different roads are illustrated by engravings made from detail drawing, and many other designs are shown by engravings made from photographs. The pamphlet also includes Mr. Bettendorf's truss bolsters made of continuous channels or plates and filling castings. In this design the joint at the end of the bolster is avoided.

*The Four-Track News* is the name of a periodical, the first number of which has just been issued by Mr. Daniels, of the New York Central. It is dated July, 1901, but whether it is to appear monthly, or quarterly, or with less frequency, does not appear. The general appearance of the pamphlet is like that of a folder, and the contents is made up of short notes concerning summer travel and other subjects usually found in a folder. There is only one time-table and that fills but two pages. It is a condensed table of through trains between New York and the principal points on the New York Central and its connections. A note in the miscellany says that the 21 dining cars and five "Empire kitchens" in service on the New York Central are now feeding about 8,000 persons daily; though we are not sure but this number includes the persons served at the seven station restaurants, which now are kept open night and day. There is a map in which the 17 cities at which Pintsch gas lighting plants are established are indicated by stars, and there is a notice of Mr. W. H. Boardman's book, "The Lovers of the Woods."

*Track.*—The Railroad Supply Company, Bedford Building, Chicago (also New York City), issues a little pamphlet designed as a pocket-book for trackmen. It gives a good deal of information about tie plates and the method of putting them in, as well as information concerning other specialties made by this company. These include the Bryant rail saw, the Sampson rail bender, rail drills, nutlocks, switch stands, frogs, etc. One novelty shown is a push car rigged with a small pile driver designed for convenient use in setting tie plates. The plate having been inserted under the rail a straddler is put across the rail and the blow of the pile driver is delivered through this. This method was suggested and adopted by the Southern Pacific Company on their Atlantic system. Another special machine shown is for bedding tie plates in new ties before they are put in track, which machine is owned and leased by the Railroad Supply Company. This company also has two cars for sprinkling the roadbed with oil. These cars are loaned for experimental uses. The company also controls the Torrey ballast car patents, concerning which we have recently written.

## TECHNICAL.

### Manufacturing and Business.

C. B. Hutchins & Sons, Detroit, Mich., have opened a Chicago office at 827 Monadnock Building, in charge of S. D. Anderson.

The Chicago Grain Door Co. has recently received orders for grain door equipment for cars as follows: 800 Chicago Great Western, 800 Intercolonial of Canada, 1,300 Illinois Central, 250 Norfolk & Western, 300 Chesapeake & Ohio, 600 Canadian Northern, 2,000 Chicago, Milwaukee & St. Paul, together with 5,000 Security dock brackets to be used in conjunction with outside doors.

Col. Jas. L. Taylor, of 71 Wall street, New York City, has been appointed New York Agent for C. H. Whall & Co., of Boston. Colonel Taylor was for some time the representative, in Europe, for the Pennsylvania Railroad, and was previously connected with the Southern Railroad and Plant System. Until recently he was Third Vice-President of the Consolidated Railway Electric Lighting & Equipment Co.

### Iron and Steel.

Charles H. Steadman, Addyston, Ohio, has been appointed General Superintendent of the Bessemer (Ala.) plant of the United States Cast Iron Pipe & Foundry Co.

Howard K. Williams, Manager of the Mingo Junction plant of the American Sheet Steel Co., has resigned, and is now with the Duquesne plant of the Carnegie Steel Co.

Frederick Miller, heretofore Superintendent of the galvanizing plant of the American Steel & Wire Co., at Rankin, Pa., has accepted a similar position with the Pittsburgh Steel Co.

### Bids for Canal Work.

Major J. H. Willard, Corps of Engineers, U. S. A., 1637 Indiana avenue, Chicago, will open bids, on Sept. 3, for building four miles, or less, of the western section of the Illinois & Mississippi Canal.

### Manila Harbor Improvements.

Three bids for the harbor improvements at Manila, Philippine Islands, mentioned April 26, p. 287, were opened Aug. 1. The bid of the Atlantic, Gulf & Pacific Co., which was approximately $1,950,000, was accepted.

### Composite Board.

W. S. Huntington has resigned as Vice-President and General Manager of the Composite Board Co. The duties of General Manager were assumed by Treasurer J. H. Winters, on July 24, with office at Fulton, N. Y. (March 29, p. 227.)

### Allegheny Grade Crossings.

Engineers of the Pennsylvania Company are said to have plans prepared for the elimination of all grade crossings within the city of Allegheny, Pa. An agreement is said to have been made with the city. The work is to be started soon. A temporary incline on a wooden trestle work will be built at the Pittsburgh end of the Fort Wayne bridge until the elevated work in Allegheny and the new river bridge are finished.

### Two New Naval Dry Docks.

Plans are reported finished at the Navy Department, Washington, for the new dry dock at the New York Navy Yard, and bids will soon be wanted for the work. The new dock is to have a depth of 30 ft., and it will be built of stone. Plans have also been made for a stone dock at the new naval station at Charleston, which will be larger than the New York dock and take the place of the dock at Port Royal. The cost of these docks will be over $1,000,000 each.

### Bridge Work on the Oregon Railroad & Navigation.

Three steel bridges, each 80 ft. long, are being built just south of Tekoa, Wash., one at the northwest city limits and the other two within half a mile of the first. Each bridge will rest on solid concrete foundations, and each weighs 55 tons. A similar bridge will be built across Rock Creek at Rockford, and next year a new steel bridge will be built across the Spokane River at Spokane, Wash., and two steel bridges will be built on the Wallace branch.

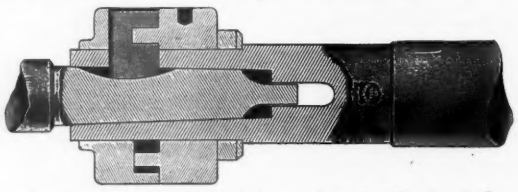
The O. R. R. & N. will also fill all trestles on the main line between Spokane and Tekoa, and put in iron pipes or stone culverts.

### Maryland Steel Co.

In the reorganization of the Pennsylvania Steel Co., funds were provided for improvements to be made at the works of the Maryland Steel Co. at Sparrows Point. The improvements and enlargements, it is said, will cost about $4,000,000. The first work to be done, according to a report in the *Manufacturers' Record*, will be the building of a plant of by-product coke ovens, to cost about $750,000, and to have an output of from 1,000 to 1,200 tons of coke per day. A portion of the gas generated from the oven plant, will, it is understood, be used as fuel for the works, while it is also reported that illuminating gas will be produced. The building of these coke ovens will probably be followed by the addition of other industries.

### The Standard Grip Socket.

The grip socket here shown is one of the time and money saving devices made by the Standard Tool Co., Cleveland, Ohio. It is made suitable for straight or taper shank twist drills and similar tools. The design is simple and effective. A half turn of the gnurled collar is required to fully open the socket to receive the tool. Indicator marks or signs to distinguish when the



socket is properly adjusted to receive the shank of the tool are unnecessary. The strong key which holds the shank is governed by an eccentric cam which makes it absolutely secure and positive. These advantages should be fully recognized in shops. Drills with broken tangs can be used, and injury to new drills is prevented. The socket is made of steel, all parts interchangeable.

### Organization of the American Locomotive Co.

The following lists give the completed working organization of the American Locomotive Company. The selling organization has not yet been completed.

Directors—S. R. Callaway, 25 Broad street, New York; A. J. Pitkin, 25 Broad street, New York; Pliny Fisk, 29 Nassau street, New York; G. R. Sheldon, 2 Wall street, New York; W. Seward Webb, Shelburne, Vt.; Joseph Bryan, Richmond, Va.; F. H. Stevens, Buffalo, N. Y.; Charles Miller, Franklin, Pa.; J. E. French, 71 Broadway, New York; G. W. Hoadley, Providence, R. I.; S. L. Schoomaker, 25 Broad street, New York.

Officers—President, S. R. Callaway, New York; Vice-President, A. J. Pitkin, New York; Second Vice-President, R. J. Gross, Dunkirk; Secretary, Leigh Best, New York; Treasurer, C. B. Denny, New York; Comptroller, C. E. Patterson, New York; Mechanical Engineer, J. E. Sague, New York; General Purchasing Agent, H. C. Hequembourg, New York.

Superintendents—Schenectady Works, A. M. White, Schenectady, N. Y.; Brooks Works, James McNaughton, Dunkirk, N. Y.; Pittsburgh Works, J. H. McConnell, Allegheny, Pa.; Richmond Works, H. A. Gillis, Richmond, Va.; Cooke Works, Fred. Cooke, Paterson, N. J.; Rhode Island Works, George Gurry, Providence, R. I.; Dickson Works, C. A. Delaney, Scranton, Pa.; Manchester Works, James R. Howgate, Manchester, Vt.

## THE SCRAP HEAP.

### Notes.

The Cincinnati, Hamilton & Dayton is using coke fuel on four of its passenger locomotives.

"The Railway Men's Mercantile League" is the name of an organization for mutual benefit which it is said has been formed at Chicago by sleeping car porters.

A large new passenger car, with transverse seats, now in use on the street railroads of St. Louis, has no roof. The car is designed for use in the summer evening excursion business, and it seats 128 persons.

At Council Bluffs one night recently about two hundred tramps boarded a freight train with a view to getting a free ride into South Dakota, and the train men had to get the assistance of the police to drive them off.

The great rush of people to Oklahoma on the occasion of the opening of public lands there for settlement has already been noticed in these columns. A Fort Worth paper says that on one of the trains of the Rock Island road carrying people to the territory 241 fares were collected by the conductor from persons riding on top of the cars.

*Herapath's Journal* says: "Railway companies who, for some reason or other, are content with the refreshment bars run by Spiers & Pond would do well to look into the published accounts of the company, the gradual slipping away of the reserve fund, and the fall in the price of shares from 28⅜ in 1897 to 12 at the present time. Why railway companies cannot run their own bars is a mystery, and we believe a good source of revenue is lost by the neglect to do so." That is an English view. If we go the same distance westward (to San Francisco) we find the opposite. The Southern Pacific has just discontinued the sale of liquors on its boats running across the harbor to Oakland, and it thereby sacrifices, so the reporters say, $150 a day.

The Supreme Court of Michigan has handed down another opinion affecting the authority of the Commissioner of Railroads in regard to the separation of grades of electric and steam railroads. An application was made by the Jackson & Suburban Traction Company for the approval of a grade crossing of the Michigan Central on Page avenue in Jackson. The Commissioner refused to approve the grade crossing and issued an order requiring that the crossing be made by means of an overhead bridge. The Traction Company and the city of Jackson then asked the Supreme Court to set aside the order of the Commissioner and permit the grade crossing, claiming that under the charter of the city all control and regulation of streets was vested in the common council of the city. The court, however, upheld the order of the Commissioner, holding that the police power of the state in matters of this nature is superior to any local authority; a general state law cannot be set aside by the charter of a municipality.

### Traffic Notes.

The railroads carrying grain from Buffalo to New York, on Aug. 1 advanced the rate on all kinds of grain one-quarter of a cent a bushel. The new tariff is for the month of August only.

It is announced that on Sept. 1 the offices of the Southern Pacific and Union Pacific in St. Louis will be consolidated; and it is rumored that, as a result of the community of ownership of these two companies, similar action will be taken in other cities.

It is reported from Buffalo that the railroads of that city have agreed to discontinue storing flour without charge. It is said that last winter 250,000 barrels of flour, on the way from the Northwest to the seaboard, were stored for long periods at Buffalo without charge.

Chicago despatches say that the roads carrying passengers to summer resorts in Northern Wisconsin and Michigan have made radical reductions in the fares on account of a falling off in the business consequent upon the low prices at which tickets can be bought to Buffalo, to Colorado and other resorts.

Tickets have lately been taken up in large numbers on roads west of Chicago which prove to have been counterfeit. The tickets purport to have been issued by the Chicago, Indianapolis & Louisville, and a ticket broker in Chicago has been arrested on the charge of forgery. It is said that Lehigh Valley tickets have also been counterfeited.

A Chicago paper says that of the large number of round trip tickets sold to that city recently on the occasion of the Baptist convention not one fell into the hands of a scalper. The return portions of these tickets were not dealt with at a joint agency, but were taken up by the conductor before the passenger entered Chicago. The receipt given by the conductor was presented at the regular railroad ticket office on the return trip.

The railroads centering in Buffalo appear to be keeping up a vigorous war on the ticket scalpers. As heretofore noted, the Lackawanna is taking a leading part. This company secured sixty-four temporary injunctions against ticket brokers, and the names and addresses of these sixty-four are printed in the *Buffalo Enquirer*. Six brokers have been arrested on charges of forgery. The brokers are taking active measures for defence, and it seems likely that the litigation will last several weeks or months. Ticket scalpers at Indianapolis have been forging and mutilating a good many tickets lately.

Newspaper reports concerning the freight rate situation at Chicago are very confusing and contradictory, and no one seems to be able to get at the real situation; but the statements which indicate that on export freight rates below the tariff are common on all the roads, appear to be well founded. West of Chicago the latest news is that all irregular rates were to be abandoned on Aug. 8; but there is no assurance that all of the roads have joined in this resolution. Between Chicago and St. Paul the situation appears to be the same as in the other two fields mentioned; there is a strong effort to terminate all secret contracts, but very little evidence that a move of this kind will be successful.

### Oiled Roadbed on the Northwestern.

The Chicago & Northwestern has oiled five miles of double track near La Crosse, Wis.

### Road for Turkestan.

Surveys are reported in progress for the road from Orenburg, Russia, on the border line of Asia, to Tashkend, in Eastern Central Turkestan, about a thousand

miles, air line. An appropriation of $4,500,000 has been made for beginning this work at the terminus of a road already in operation, at Orenburg. The proposed route passes through a grazing country, in its northern half, and then follows the Syr Darya River through a cotton country which is very productive where it can be irrigated. It will connect the railroad system of European Russia with Turkestan and the Asiatic Midland road, which can only be reached at present by crossing the Caspian Sea.

### Oil on Wagon Roads.

Mr. Theodore F. White, of San Bernardino, Cal., gives the experience of that county in sprinkling oil on the streets, to lay the dust, and to form a good road. The following points are based on Mr. White's article:

In working for permanent results from 100 to 150 barrels of oil per mile are used on a roadbed 18 ft. wide. Good results are obtained from the use of oil on soil that packs hard and on loose alluvial soil, but there is uncertainty regarding its value on loose sand. Roads composed of clay or limestone should receive a light sprinkling of oil before oil is applied. Oil on land carrying much alkali forms a soap, and washes off. Such roads should be covered with other soil. Oil is applied while hot—from 200 deg. upward. Ten or 12 miles is about as far as oil can be hauled in the sprinkling tank wagons for use before it cools off. An ordinary lever harrow can be used on the streets before and after oiling to prepare the ground and mix in the oil. The teeth must be well slanted back. Not more than a quarter of the amount of oil used in the first application is necessary in succeeding years to keep the road in good condition. As compared with the cost of sprinkling roads with water to lay dust, if the original application is charged to road construction, it is much cheaper as well as more effective. A long period of wet weather with heavy traffic would lead to an oiled road becoming cut up and greatly damaged, but in California that is seldom experienced. Experience has shown that oil to a great extent prevents the disintegrating effect of storm water.

### American Railroad Men in Mexico.

Readers of the *Railroad Gazette* are familiar with the fact that in Mexico the engineman, conductor and other men on a train which kills a man, a tramp for instance, are likely to be arrested, incarcerated in a foul prison and held for many months waiting for trial; and that many such outrages have taken place. The El Paso *Herald* reports the receipt, in that city, of a letter from Secretary of State John Hay to the El Paso Chamber of Commerce promising to do all in his power to ameliorate the condition of American railroad men employed in Mexico. His letter was written in response to one requesting him to aid the Order of Railroad Conductors now seeking to influence the United States Government to protect its citizens employed on Mexican railroads. Secretary Hay incloses an official report from Ambassador Clayton, compiled from statistics furnished him by the Mexican railroad presidents. His estimate of imprisonments shows only 32 Americans thrown in prison during the year just ended. He said newspaper reports had been greatly exaggerated and in some instances where men were reported to have been put in prison, the railroads denied that such men had ever been in their employ. This was the case with King, about whom the recent agitation was started. The Ambassador declares that the fault is in the Mexican laws, which hold the servant and not the corporation responsible for accidents.

At El Paso it is alleged that the presidents of railroads in Mexico probably minimize the troubles due to outrageous arrests and imprisonments because the present law, throwing upon trainmen rather than the company the responsibility for damages to persons and property, is very favorable to the railroads.

### Driving Blower Fans.

Over 40 years ago B. F. Sturtevant, of Boston, Mass., established the first blower manufactory in the United States. Within 10 years thereafter the necessity of equipping large fans with independent means of driving led to a line of fan engines. A little over 10 years ago the increase in the use of electricity opened the way for the electric fan with motor and fan built one for the other, and the B. F. Sturtevant Co. (successors to Mr. Sturtevant) established an electrical department, and designed a line of fan motors. To-day they have patterns for over 100 sizes and types of engines, ranging from 2 to 250 h.p. and a record of over 8,000 engines sold since they first entered this field. In their various motor designs they are likewise equipped with an equal variety. A corresponding line of generators is also built by utilizing the essential parts of these motors.

### A Great Future for the Carbide Makers.

A German inventor has secured a patent on an acetylene life-preserver in the form of a belt. When the person wearing the belt is cast into the sea the belt can be inflated with gas by admitting a little water to the acetylene.

### American Locomotives in India.

The *Journal of the Board of Trade* (British) contains a report from the Locomotive Superintendent of the Oudh & Rohilkhund Railway on the working of 10 American Baldwin engines supplied to that line last year. After describing the changes made in the engines to suit them to local requirements, and the chief defects which have shown themselves, the Superintndent concludes: "Those 10 engines have been working passenger trains, running at 30 to 35 miles an hour, and goods (freight) trains, running at 20 miles an hour, chiefly the former, and they have done their work well. They steam capitally and are remarkably good starters; they get away from a station with 55 loaded coaches, equal to about 1,300 tons, with the greatest ease. They are a little higher in coal consumption than our new B class. They are easily repaired, but repairs will have to be kept up, as, if not, they will go to pieces sooner than our other engines would. They do not, as far as I can see at present, cost more in repairs than other engines, and I am very satisfied with them."

### Corundum Deposits of Canada.

Consul-General Bittinger, of Montreal, sends the following: "The Ontario deposits lie north of Kingston, and cover a large area. The corundum occurs along with mica and other substances. The deposits have only recently been discovered, and are as yet almost undeveloped. A company is starting to work some of the deposits purchased from the Government. With the discovery of the corundum deposits in such pure condition has arisen the somewhat vague hope that its more precious relations, the ruby and the sapphire, might also be found in the same region. In some places corundum has been found which shows plainly the blue line of the sapphire, but as yet no real gems have been discovered. Corundum of a very high grade—viz., 95 per cent. pure—is now being produced at Combermere by the Canada Corundum Company. The Canadian deposit is found in the Apalachian mountain range which runs through the eastern townships of Quebec, and as the rock formation is the same as in North Carolina, there is every reason to believe that corundum exists there also."

### Train Robbery Near Chicago.

On the night of July 21, about 8 o'clock, a westbound passenger train of the Baltimore & Ohio was stopped by five masked robbers near Millers, Ind., about 31 miles east of Chicago, and a mail car was destroyed by dynamite. The robbers compelled the engineman and fireman to take the two foremost cars of the train and run forward two or three miles, before they attempted their robbery, but on getting at the contents of the car they found that they had made a mistake, as the express car, containing, it is said, a large amount of money, had been left behind. The robbers took the engineman's gold watch and then retreated in the direction of Lake Michigan. While the cars were being robbed two of the gang who had remained where the train was first stopped went through one of the passenger cars and intimidated the passengers, but secured only a small amount of booty. It is said that a train encountered a malicious obstruction two nights before on the track near the scene of this robbery.

### Narrow Gage Building in Argentina.

The President of the Argentine Republic reports a new narrow-gage line building between Buenos Ayres and Rosario, 240 miles. This will make the third railroad between the two cities, and will connect the narrow gage roads of the interior with the capital of the Republic. It will then be possible to travel from Buenos Ayres to Salta, fully 900 miles north, by narrow gage railroad.

### An American Lease of the South Eastern.

At the semi-annual meeting of the shareholders of this company, in London, it was announced that an American syndicate desired to make a forty-year lease of the line, and was prepared to deposit £1,000,000 as a guarantee of a 3 per cent. dividend during the first year, and ultimately a 5 per cent. dividend. The Chairman of the company had previously reported that no dividend could be paid, and that it would be necessary to issue additional stock. No action at the time was taken on the American proposal.

### Dredging the Potomac.

As the result of dredging in the Potomac vessels drawing 21 ft. of water can now pass through the channels below Washington at low tide, and vessels drawing 20 ft. can reach the docks at Washington and Georgetown at low tide. Dredging below Washington to 24 ft. at low tide is proceeding under continuing contracts, and Col. Allen recommends that this depth be continued to the city, in order that large vessels may reach the Navy Yard. The additional cost of this improvement is estimated at $592,000.

### Public Works at Manila.

Lieut. Lytle Brown, Corps of Engineers U. S. Army, City Engineer of Manila, P. I., in reporting on the public works at Manila, says that the water supply of 40,000 cubic meters per 24 hours, now received from four pumps at the pumping station on the San Mateo River, is fast becoming inadequate and a survey has been made to determine the feasibility of getting water from the mountains by gravity. There is no sewerage system, and on account of the low level it will be difficult to devise a good system at reasonable cost.

### Draftsman for the Chief of Engineers.

The Civil Service Commission will hold an examination Aug. 20, 21, to secure a list of eligibles, from which list one appointment will at once be made to the position of topographical and mechanical draftsman in the office of the Chief of Engineers U. S. Army, at a salary of $1,000 a year. This examination will be open to all citizens of the United States.

### Grand Jury On Fourth Avenue Tunnel.

The discomforts of riding in closed passenger cars through the Fourth avenue tunnel leading to the Grand Central station, New York city, during the extremely hot weather of July aroused the reporters to unusual activity, and the newspaper discussions were so numerous that the District Attorney of New York County laid the subject before the Grand Jury. This body held an inquiry, questioning several officers of the railroad, and on Aug. 1, made a presentment to Judge Newburger in General Sessions, declaring that the companies running trains through the tunnel are maintaining a public nuisance. It recommends speedy action to abate it and makes the following suggestions:

"That the motive power in the tunnel be changed to avoid the use of coal.

"That the brick walls separating the central from the side tunnels be removed, and that steel girders be put in their places.

"That sheds be erected to cover cars standing in the yards to keep the temperature at a more endurable degree in the cars.

"That the Health Board do something to compel the changes."

### The Rush to El Reno.

The reader is doubtless familiar with the newspaper reports about the great crowds of men and women who went to Oklahoma last month to get a chance to secure a tract of Government land free. The estimates of the railroad officers rise to enormous figures, though probably they count most of the passengers both ways. A report in the *Topeka State Journal* says:

The Rock Island road and the Choctaw route have made a record in hauling the crowd that will stand as a marvel. During 15 days, beginning July 10, these two roads have hauled in and out of El Reno 320,000. With all this immense travel not a single passenger has been killed nor has one received a scratch.

From July 10 to 26, the Rock Island ran 187 trains in and out of El Reno. Each train averaged ten cars, and the Rock Island officials declare that 180,000 passengers is a conservative estimate.

The Choctaw road handled 210 trains during the same period and General Passenger Agent Lee estimates that his road handled 140,000 people.

The two roads were caught unprepared, for no one dreamed that so many homeseekers would come to El Reno. When Governor Richards estimated that 85,000 people would register he was ridiculed. The railroads didn't know that the big lottery was to come off at El Reno until four days before registration began, or they would have routed their freight, which is extremely heavy just now, so as to keep it out of the way of the business here. The Rock Island worked twenty-five clerks in a room that ordinarily accommodates four men. Its baggage came in on freight trains and the baggage room was a string of freight cars. On two days it could not buy or borrow enough passenger coaches to handle the crowds, and brought the people in and sent them out in stock cars. Plank seats were provided. Some people used the feed troughs as upper berths. Many people crawled on the engines. They would sit on the pilot and on top of the cabs, and stand on the running boards. The tops of the cars were covered and trains were only allowed to run at sixteen miles an hour. It only took about five minutes to load a train. The people would go through the windows and any other way to get in. Hundreds of women crawled through the windows.

The Choctaw experienced about the same thing. It handled all of the Santa Fe traffic from Oklahoma City to El Reno. This was enormous. Several times a day the Choctaw would simply hitch an engine on to a Santa Fe train at Oklahoma City and pull it right over here. The Choctaw ran trains during the day about three hours apart. Aside from the Santa Fe traffic, it also handled the Frisco and Missouri, Kansas & Texas passengers. With the limited facilities for handling the trains the two roads made a record that challenges admiration.

## LOCOMOTIVE BUILDING.

*The St. Louis Southwestern* is having 10 engines built by the Rogers Locomotive Works.

*The Autofogasta of Peru* is having two engines built by the Rogers Locomotive Works.

*The National of Tehuantepec* is having five engines built by the Baldwin Locomotive Works.

*The Duluth, South Shore & Atlantic* is having six locomotives built by the Rogers Locomotive Works.

*The Central of Brazil* is having four locomotives built by the Baldwin Locomotive Works.

## CAR BUILDING.

*The Pullman Co.* is building 15 cars for general service.

*The Chicago Junction* is asking bids on 100 gondola cars.

*The San Pedro, Los Angeles & Salt Lake* has asked bids on five cabooses.

*The Cincinnati, Richmond & Muncie* has ordered 109 cars from the Laconia Car Co.

*The American Car & Foundry Co.* has received miscellaneous orders amounting to 160 cars.

*The Westmoreland Coal Co.* is having one freight car built by the Middletown Car Works.

*The Grand Rapids & Indiana* has ordered 100 coal cars from the American Car & Foundry Co.

*The Paris & Orleans*, of France, has ordered 100 coal cars from the American Car & Foundry Co.

*The St. Louis, Kansas City & Colorado* is having 25 freight cars built by the Mt. Vernon Car & Mfg. Co.

*The Government Railroads of Australia* have increased the order with the Pressed Steel Car Co. from 250 to 450 cars.

*The Chicago Great Western* has ordered four 63-ft. combination mail and baggage cars from the American Car & Foundry Co.

*The Hamburg, Weston & Southern* has placed orders with the American Car & Foundry Co. for one first-class passenger coach, one combination first and second class coach, one combination passenger, baggage and mail car and five flat cars of 60,000 lbs. capacity.

*The Norfolk & Western* will build some cars at its Roanoke shops, as noted in our issue of Aug. 2. The order calls for 500 box cars of 80,000 lbs. capacity. They will measure, 36 ft. long, 8 ft. 6 in. wide and 7 ft. 6 in. high. Four hundred will have wood frames and underframes and the balance steel frames and underframes. They will be equipped with N. & W. design bolsters and brake-beams, Westinghouse brakes, Ajax Plastic Bronze brasses, Chicago steel couplers, Wagner doors and Chicago roofs.

*The Southern* order with the American Car & Foundry Co. for 100 box cars, referred to Aug. 2, is an addition to the large order placed some time ago with the same builders. The cars will be of 60,000 lbs. capacity, measure 40 ft. 7¾ in. long, 8 ft. 10 in. wide and 9 ft. 3⅝ in. high from bottom of sill to top of running board, and will have Fox bolsters, Westinghouse air-brakes, Janney couplers, Jones door fixtures, Thornburgh single draft rigging, Morris pressed steel journal box lids, Chicago roofs and Scott springs.

## BRIDGE BUILDING.

AIKEN, MD.—One span of the Baltimore & Ohio bridge over the Susquehanna River here has been condemned. The bridge is a very long structure and traffic will go over the Pennsylvania's bridge while the B. & O. bridge is being replaced.

ALEXANDRIA, LA.—Bids are wanted, Aug. 26, for a steel highway bridge, with foundations and approaches, over Bayou Rapides at this place. Ira W. Sylvester, City Engineer.

AMSTERDAM, N.Y.—There are two bridges proposed, one an overhead crossing at Mineville street over the West Shore tracks, and another on the same street over the Erie Canal. The work will be paid for jointly by the New York Central, the state and the city of Amsterdam. The bridge over the railroad will cost about $30,000, and that over the canal about $12,000. It is expected to advertise for bids this fall.

ANDERSON, IND.—The Wabash Bridge & Iron Co. will build a bridge over White River for the Big Four at a cost of $30,000.

ATCHISON, KAN.—Plans are being made by City Engineer Fred. Giddings, for the proposed viaduct over the tracks at Seventh street.

CAMDEN, N. J.—County Engineer Albertson is reported surveying for the bridge proposed over Cooper's Creek at East Pine street, for which part appropriation is made. The estimated cost is $25,000.

CARTHAGE, TENN.—The Caney Fork Bridge Co. was recently incorporated in Tennessee by E. M. McDonald, J. E. and J. G. Gold, H. P. Dowell and Wm. Gwathney, of Smith County. The capital stock is $9,000, and they

propose to build a toll bridge over Caney Fork River, about one-fourth of a mile above Trousdale Ferry, in Smith County.

CHICAGO, ILL.—The following are the bids received for the superstructure for the two bascule bridges over Chicago River—H, Harrison street bridge; S, State street bridge: American Bridge Co., H $93,500, S $87,900; King Bridge Co., H $103,700, S $104,100. Substructure—G. H. Sager & Co., H $60,372, S $67,363.85; Jackson, Corbett & Co., H $66,498, S $66,855.55; Lydon, Drews & Co., H $55,274, S $58,845.85; Morrison, La Bounty & Co., H $68,369, S $74,411.55; The Fitz-Simons & Connelly Co., H $62,094; S $64,448.08; Thomas Phee, H $78,119.

DOYLESTOWN, PA.—The County Commissioners will receive bids, until Aug. 29, for a bridge in Tullytown. The Board is considering an appropriation for a new bridge in East Rockhill Township.

ELKADER, IOWA.—We are told that Clayton County is considering building three stone arches of about 20 ft. each, near Garnavillo, Gundor and North McGregor.

FLINT, MICH.—A. W. Hall, City Engineer, is making plans and specifications for both a stone arch and for a steel truss bridge over Flint River on Saginaw street. Later it will be decided which will be built.

FORT DODGE, IOWA.—The Chicago Great Western, according to report, is to begin work for a bridge over the Des Moines River near Fort Dodge, for the Omaha & Sioux City extension. A viaduct type of bridge has been planned, with a total length of 3,000 ft.

GIRARD, KAN.—The Crawford County Commissioners, at their August meeting, will make appropriations for bridges as follows: Across Bone Creek, Lincoln Township, 40-ft. span; across Elm Creek, Grant Township, 40-ft.; across Cow Creek, Washington Township, 50-ft. span; across Cow Creek, Baker Township, 40-ft., and another span of 60 ft.

JERSEY CITY, N. J.—The Central R. R. proposes to increase the length of the bridge in Communipaw avenue, where it has tracks across below grade.

JOHNSONVILLE, TENN.—The Nashville, Chattanooga & St. Louis has contracted with the Louisville Bridge Co., of Louisville, Ky., for a steel bridge over the Tennessee River at this place, at a cost of about $75,000.

KALAMAZOO, MICH.—A street and bridge committee is about to let the contract for a bridge over Portage Creek at Bryant street. (June 7, p. 387.)

KANSAS CITY, MO.—The promoters of the Kansas City & St. Joseph Electric Ry., propose to build a bridge over the Missouri River either at the foot of Broadway, Grand avenue or Walnut street. S. Reed Anthony, of Tucker, Anthony & Co., Boston, who are interested in this railroad, are reported negotiating to buy from Theo. C. Bates, the Winner bridge piers and to build on that site.

MANKATO, MINN.—Bids are wanted, by the County Auditor, until Sept. 2, for an I-beam bridge over Bull Run Creek, according to plans on file at the Auditor's office.

MONTEREY, MEXICO.—It is reported that a number of bridges will be rebuilt on the Monterey & Mexican Gulf, which will soon be managed by the Mexican Central.

NEW WESTMINSTER, B. C.—The Government of British Columbia proposes to build a steel highway bridge about 2,500 ft. long over Fraser River at New Westminster. We are told that plans are not fully decided but $500,000 is provided for the work. The Great Northern may have running rights over the bridge, but the work will be contracted for by the Provincial Government.

OLIVET, S. DAK.—According to report, bids are wanted, Sept. 4, for a steel bridge over James River, at Milltown, to be of one 125-ft. span, one 135-ft. span, and two approach spans 16 ft. and 20 ft. each. D. D. Wipf, County Auditor.

OMAHA, NEB.—The proposition to build a viaduct over O street, in South Omaha, is again being considered by the Union Pacific and the Union Stock Yards Co. Plans for a structure to cost about $80,000 were made about a year ago by W. S. King, Chief Engineer of the Union Stock Yards Co.

OTTAWA, ONT.—The Ontario Government will build a $4,000 bridge at Petewawa; and a $6,500 bridge at Urigle, and another over the Peninsular Creek, Muskoka. The plans, etc., are not made.

PHILADELPHIA, PA.—Plans for the new bridge to be built over Lansdowne Glen, West Park, for the Park Commissioners, are being made by the City Engineer. The structure will be of stone and iron and cost about $100,000. It will probably be authorized this fall so work may be begun in the spring.

The Baltimore & Ohio, we are told, will award a contract in a few days for the steel work on the overhead crossing of Commercial avenue, Philadelphia.

The Board of Surveyors have confirmed the plan of a bridge to be built by the Pennsylvania across Fifty-second street, to take the place of the present 50-ft. wide structure. The new bridge will be 100 ft. wide.

PITTSBURGH, PA.—The Pennsylvania R. R. intends, according to report, to abolish the grade crossings at East Liberty, East Pittsburgh, Wilmerding and Wilkinsburg, by building overhead or undergrade crossings.

PUEBLO, COLO.—The City Council is petitioned to let the contracts for the abutments of the proposed viaduct at South Main street. There is an appropriation of $10,000 to begin this work.

RAVENA, N. Y.—The State Board of Railroad Commissioners gave a hearing, last week, on the application of the New York Central for the abolition of a West Shore grade crossing on the Delaware turnpike at Ravena.

REISTERSTOWN, MD.—The Carroll County Commissioners have approved the site for the proposed bridge over Patapsco Falls, between Carroll and Baltimore counties.

RIDGWAY, PA.—We are told that the Commissioners of Elk County propose to build an arch truss bridge of about 100 ft., for which bids will be wanted about Nov. 1. John Morgan, County Engineer.

SAGINAW, MICH.—The Council's Committee on Grounds and Buildings is reported to have recommended building the Genesee street bridge before anything is done with the other bridges proposed. The plans are approved by the Board of Public Works, but must be approved by the Council before work can be advertised. The bridge will be about 720 ft. long, of steel with masonry piers and abutments, and have a bascule draw. The estimated cost is $200,000. Alfred Davies, City Clerk, will receive the bids when the time is set. H. E. Terry, City Engineer.

ST. CATHARINES, ONT.—The two bids received by the City Council for the steel Queenston street bridge were rejected and new bids will be wanted.

SAN JOSE, CAL.—We are told that H. A. Pfister, County Clerk, will receive bids, on Aug. 19, for a steel bridge on concrete piers, over Coyote River on Tully Road. The span is 120 ft.

SHERBROOKE, ONT.—Bids are wanted, by T. J. Griffith, Secretary and Treasurer of this city, until Aug. 15, for a riveted steel bridge over Magog River at Wolfe street.

SPRINGFIELD, OHIO.—The County Court has reported favorably on the proposed bridge over the James River near Kinser. It will be about 144 ft.

SUMMERVILLE, GA.—Bids are wanted, Aug. 22, for a steel or wooden bridge 100 ft. long, over Chattanooga River. A. S. Hamilton, Chairman of the County Commission.

TOPEKA, KAN.—New bids are wanted, Aug. 16, for the bridge on Sardou avenue. The former bids were rejected. The appropriation is $20,000.

TORONTO, ONT.—The Rosedale Bridge, a large steel structure on Toronto's city limits, has been condemned as unsafe by City Engineer Rust. The estimate for repairs is $11,000. Bids will be called for shortly.

TOWANDA, PA.—Proposals are wanted by the County Commissioners, until Aug. 13, for the superstructure of four spans of the following lengths: 55½ ft., 76 ft., 41½ ft., 45 ft. Bidders must furnish their own plans for superstructure. H. M. Spalding, County Commissioner.

TROY, OHIO.—An ordinance is before the Council forbidding the Miami Valley Electric R. R. from crossing the bridge now building, and requiring that company to build its own bridge on Market street.

VICKSBURG, MISS.—Bids are wanted, Sept. 2, for the 140-ft. steel drawbridge over Big Black River at Fisher's Ferry. W. H. Stanton, Designing Engineer.

WALKERTON, ONT.—Bids are wanted, by Benj. Cannon, Warden, Bruce County, for the steel superstructure and steel cylinder foundations of a bridge over San Green River in the Township of Brant, south of Hanover. Plans and specifications may be seen at the office of J. Hutcheon, Guelph, Ont.

WATSEKA, ILL.—On Aug. 17, the contract will be awarded for the material and building the substructure and superstructure of a 252-ft. highway bridge on stone masonry. The bridge is situated at Plato, Iroquois County. Specifications may be seen at the office of the Town Clerk of Ashkum, Iroquois and Martinton Townships, and at the office of the County Clerk at Watseka, and at the office of Ira O. Baker, Engineer, Champaign, Ill.

WAUSAU, WIS.—A new bridge, according to report, will be built over Wisconsin River in the southern part of the city.

WOODSDALE, OHIO.—The County Commissioners will receive bids at 11 a. m., Aug. 23, for the Pratt truss bridge over Miami River, mentioned in this column last week.

### Other Structures.

ALBUQUERQUE, N. MEX.—The Santa Fe Pacific is building additions to its shops at Albuquerque, N. Mex., consisting of the following: Machine shop, 110 ft. wide x 358 ft. long, with walls of stone and glass, and with roof supported by steel columns and covered with tiling. A boiler shop 80 ft. wide and 110 ft. long will have walls and roof similar to the machine shop. A brass foundry 35 x 50 ft., and a transfer pit 34 ft. wide x 400 ft. long will also be built. The total estimated cost of the additions is $50,000.

BOSTON, MASS.—Bids were opened at the Navy Department, on Aug. 3, for two buildings and a steam heating plant for the Boston Navy Yard. The buildings are a steam fitters' and a metal workers' shop, and the bids for both buildings were as follows: Pennsylvania Bridge Co., Beaver Falls, Pa., $338,917; F. G. Coburn & Co., Melrose, Mass., $327,500; Norcross Bros., Worcester, Mass., $395,600; L. L. Leach, Chicago, $324,000; Snare & Trieste, of New York, $352,000; D. H. Hayes Co., Chicago, $348,794; J. A. Colson, Charleston, Mass., $370,000; Mead, Mason & Co., Boston, $355,000. The prices given are varied considerably by alternate propositions allowed by the specifications.

BRISTOL, TENN.—The Southern is reported considering building a large freight depot in Bristol. A union station for the Southern and Norfolk & Western is also being considered. Estimated cost, $100,000.

CHICAGO, ILL.—Plans for a central union terminal station in Chicago are reported being made to be submitted to a meeting of railroad officers to be held on Aug. 15.

CLEBURNE, TEXAS.—The Gulf, Colorado & Santa Fe is reported making plans for new buildings, which include a $13,000 station at Beaumont; also a nine-stall roundhouse at that place. Plans for depots are being made for Brenham, Ardmore, Gainesville and Morgan. A new station is under consideration at Silsbee. The station at Cleburne will be remodeled. A baggage room and a room for trainmen will be added.

HANNIBAL, MO.—The Atlas Portland Cement Co., New York City, has bought 1,400 acres of cement lands near Hannibal, and, we are told, will build a western plant.

HOUSTON, TEXAS.—The Southern Pacific Co. will enlarge its shops here by building a 100 x 140 ft. foundry; 120 x 240 ft. coach and wood working shop; 70 x 140 ft. addition to machine shops and 50 x 50 ft. addition to pattern shop.

KENT, OHIO.—The Seneca Chain Co. has bought the plant of the Royal Machine Co., and will make a 30 x 64 ft. addition.

LOUISVILLE, KY.—Plans for a new passenger station for the Southern Ry., to be built at Fourth avenue, where the company's tracks cross, have been finished. The building will be two stories high, built of brick with stone trimmings. The cost will be about $10,000.

MILWAUKEE, WIS.—The Allis-Chalmers Co. has placed contracts for the steel and iron to be used in its second large machine shop at West Allis, Wis., and it is stated that the company will go right ahead and build three of these shops, as well as the foundry. Each of the shops will be 575 ft. long and 120 ft. wide, with two 125-ft. galleries. The main shop, which will be at right angles to the machine shops, five to seven in number, will be extended, from time to time, as the additional shops running out from it demand, until it will eventually be one-half mile long. One of the new 575-ft. shops will be larger than the entire old Corliss engine plant.

MONTEREY, MEXICO.—The Monterey Foundry & Machine Co. is repotred to be making plans with a view to build an entire new plant, rendered necessary by the increased demand for machinery and railroad supplies in that country.

NEW ORLEANS, LA.—The New Orleans & Northeastern proposes to make some improvements to the wharf property between St. Ferdinand and Clout streets.

OAK GROVE, PA.—According to report, J. E. and A. L. Pennock, contractors, of Philadelphia, will receive subbids, until Aug. 12, for a number of shops and engine house at Oak Grove; also for an engine house at Clearfield, for the New York Central & Hudson River R. R., Pennsylvania Division. The plans were made by C. A. Reed, Architect, of New York City, and include a fireproof oil house, store house, blacksmith shop, 201 x 40 ft., erecting shop, 564 x 126 ft., tank, truck, and boiler shop, freight car shop, coal house, hose house, wheel shop, wood mill, power house, 20-stall engine house, with turntable pit and deck, hot air ducts and coal trestle at Oak Grove, and an eight-stall engine house, with turn-table, coal trestle, etc., at Clearfield.

RICHMOND, VA.—Improvements to the amount of $100,000 are authorized to be made at the Richmond works of the American Locomotive Co. This will be chiefly for electrical appliances and new machinery, and will increase the weekly output of the works from six to eight or ten heavy locomotives.

SCRANTON, PA.—Mathias H. Stipp has the contract for building a new freight depot for the Delaware & Hudson at $17,000. It will be 35 x 190 ft.

YOUNGSTOWN, OHIO.—The Republic Iron & Steel Co. has completed plans for an 8-in. mill which will be built adjoining the new blooming and billet mills.

## MEETINGS AND ANNOUNCEMENTS.

*(For dates of conventions and regular meetings of railroad associations and engineering societies see advertising page xvii.)*

### Society of Naval Architects and Marine Engineers.

The annual meeting of the society will be held at 12 West Thirty-fifth street, New York City, probably on Nov. 14 and 15. W. L. Capps, Secretary.

### Central Association of Railroad Officers.

At the annual meeting in Toledo, W. A. Brimson, Superintendent of the Baltimore & Ohio Southwestern, at Chillicothe, O., was elected President, and O. G. Fetter, of Cincinnati, O., was re-elected Secretary and Treasurer.

### American Society of Mechanical Engineers.

Mr. Arthur L. Rice has been appointed to the new position of Assistant to the Secretary. The duties of the office will comprise: Much of the routine work that has hitherto been done by the Secretary; the care and cataloguing of the library, and the consulting of references for members living at a distance; the management of the "Employers' Bulletin;" general duties in connection with conventions, etc., and taking charge of reunion of the society during the winter months. Mr. Francis W. Hoadley will hereafter devote all of his time to the society accounting.

### International Association of Municipal Electricians.

The Sixth Annual Convention will be held at Niagara Falls, New York, Sept. 2, 3 and 4. Some of the papers to be read are, "Underground Electrical Construction, from a Municipal Standpoint," Edw. F. Schurig, City Electrician, Omaha, Neb. "Inadvisability of Placing High and Low Potential Wires Through the Same Series of Conduits, or Through the Same Manholes." "The Protection of Fire and Police Telegraph Wires from High Tension Currents and Lightning," W. M. Petty, Rutherford, N. J. "Improved Storage Battery for Municipal Purposes," J. W. Aydon, Wilmington, Del.

### The Traveling Engineers' Association.

The ninth annual convention of The Traveling Engineers' Association will be held at the Continental Hotel, corner of Ninth and Chestnut streets, Philadelphia, Pa., commencing at 9 a. m., Sept. 10, 1901. Among the subjects to be reported on are:

Methods of firing locomotives to obtain best results, all conditions to be taken into consideration.

Locomotive lights, their care and operation.

Is it a good practice to use grease to lubricate locomotive crank pins?

The use of the steam engine indicator as an aid to the traveling engineer to determine the efficiency of the locomotive in service and the benefits derived therefrom.

### National Railroad Master Blacksmiths' Association.

A. L. Woodworth, Lima, Ohio, Secretary, tells us that the ninth annual convention will be held at Denver, Col., on Aug. 20. Headquarters will be at the New St. James Hotel, for which special rates have been made. The chairmen of the committees are: Executive, Jas. Fenwick; Arrangements, W. W. McLellan; Apprenticeship System, S. Uren; Manipulation of Tool Steel, G. F. Hinkens; Track Tools, Benj. Burgess; Flue Welding, J. G. Jordon; Waste of Coal at Blacksmith's Forge, J. F. Pfeifer; Furnaces and Fuel for Same, Jos. Northend; Methods of Manufacturing Crank Pins and Piston Rods, both Steel and Iron, D. B. Swinton; Case Hardening, G. H. Judy; Improvements in Locomotive Forging, F. Norris; Repairs of Locomotive Frames, L. P. Barnes; Tools and Formers, D. Fitzgerald.

### Iron and Steel Institute.

The autumn meeting of the Iron and Steel Institute (British) will be held at Glasgow, on Tuesday, Wednesday, Thursday and Friday, Sept. 3, 4, 5 and 6. The meeting will be held simultaneously with the International Engineering Congress, Section V. (Iron and Steel). Apart from the Congress, a programme of excursions to works and of social functions has been arranged by an influential Local Reception Committee, of which Mr. William Beardmore (Member of Council of the Iron and Steel Institute) is Chairman, Mr. Archibald Colville, Vice-Chairman, and Mr. James G. Jenkins (33, Renfield street, Glasgow), Honorary Secretary. Messrs. George Beard, David Colville, William Clark, Walter Dixon, George Garrett, J. G. Stewart, William Wylie and E. J. Windsor Richards are the members of the Executive Committee, while the General Committee includes

a number of the members of the West of Scotland Iron and Steel Institute, and of the leading ironmasters of the district.

The President will deliver a short address, and the following papers have been offered:

1. On the iron and steel industries of the West of Scotland. By a committee of the West of Scotland Iron and Steel Institute.
2. Report on the nomenclature of metallography. By a committee of the Iron and Steel Institute.
3. On the presence of calcium in high-grade ferro-silicon. By G. Watson Gray, Liverpool.
4. On the spectra of flames at different periods during the basic Bessemer blow. By Professor W. N. Hartley, F. R. S., Dublin, and Hugh Ramage, Cambridge.
5. On iron and copper alloys. By J. E. Stead, Middlesbrough, Member of Council.
6. On the effect of copper in steels for wire manufacture. By J. E. Stead and F. H. Wigham, Middlesbrough.
7. On the correct treatment of steel. By C. H. Ridsdale, F. I. C., Middlesbrough.
8. On the profitable utilization of power from blast-furnace gas. By B. H. Thwaite, London.
9. On Brinell's method of determining hardness and other properties of iron and steel. By Axel Wahlberg, Stockholm.
10. On the variation of carbon and phosphorus in steel ingots. By Axel Wahlberg, Stockholm.
11. On internal strains in iron and their bearing upon fracture. By Arthur Wingham, F. I. C., Torquay.
12. On a mechanical gas producer. By Benjamin Talbot, Leeds.

### Master Car and Locomotive Painters' Association.

The Thirty-second Annual Convention of this Association will be held at Buffalo, N. Y., Sept. 10, 11, 12 and 13, convening at 9 o'clock, a. m., on Tuesday, the 10th. The official headquarters will be at the Columbia Hotel, where a meeting room in which to hold the daily sessions has been secured.

A cordial invitation is extended to Foremen Car and Locomotive Painters throughout the States and Canada to the convention.

The following is the programme with the committees:

1. Is there a method of successfully treating passenger cars (going through shops for re-varnishing) which are more or less cracked and which have recently been cleaned at terminals with emulsion or other cleaners containing mineral or non-drying oils? W. J. Russell, G. R. & I. Ry., Grand Rapids, Mich.; C. B. Harwood, C. & O. Ry., Huntington, W. Va.
2. In a material sense, what progress has been made in terminal car cleaning? William Vogel, Missouri Pacific Ry., St. Louis, Mo.; S. H. McCracken, L. H. & St. L. R. R., Cloverport, Ky.
3. Practical suggestions regarding interior decoration of passenger cars. George Schumpp, L. & N. R. R., Louisville, Ky.; A. T. Winchell, Am. Car & Foundry Co., St. Charles, Mo.; Frank Taylor, late of Barney & Smith Mfg. Co., Dayton, Ohio.
4. Is it practical and to the interest of the railroad companies to adopt a piece price for all classes of painting repairs in the car paint shop without employing a certain percentage of day men? W. H. Truman, Southern Ry., Columbia, S. C.
5. The relations which should exist between the railway company's purchasing powers and the master painter. J. A. Gohen, C., C., C. & St. L. Ry., Indianapolis, Ind.
6. What is the best paint material to use for the protection of iron and steel tanks on locomotives after the same has been prepared to receive it? C. I. Eagle, L. S. & M. S. Ry., Cleveland, O.; Eugene Daly, C., C., C. & St. L. Ry., Bellefontaine, Ohio; R. B. Pebbles, L. S. & M. S. Ry., Elkhart, Ind.
7. Has the painting of freight cars with the spraying machine shown that there is any economy in its use? Is it not rather an additional cost over brush painting, and does it not produce work of an inferior quality? T. J. Mullally, the Armour Car Lines, Chicago, Ill.; M. W. Stevens, L. S. & S. R. R., Drifton, Pa.; J. G. Ginther, Wabash Ry., Moberly, Mo.
8. What is the best method of preparing steel freight cars for paint; and what is the best material to use? B. F. Seisler, P. & W. R. R., Allegheny, Pa.; B. T. Wynn, Pennsylvania R. R., Pitcairn, Pa.; Eugene Laing, N. C. R. R., Elmira, N. Y.
9. Report of Committee on Tests. W. O. Quest, P. & L. E. R., McKees Rocks, Pa.; T. J. Rodabaugh, P. Ft. W. & C. Ry., Ft. Wayne, Ind.; Frank Crocker, K. C., Ft. S. & M. R. R.

Car cleaning tests to be reported at the convention by W. C. Fitch, Southern Pacific Ry., Sacramento, Cal.; J. A. Gohen, C., C., C. & St. L. Ry., Indianapolis, Ind.; C. E. Copp, B. & M. Ry., Lawrence, Mass.; John Rattenbury, C. R. I. & P. R. R., Chicago, Ill.; J. A. Putz, W. C. R. R., Stevens Point, Wis.; J. A. P. Glass, Y. & M. V. R. R., Vicksburg, Miss.; W. L. Marsh, W. Ry. of Ala., Montgomery, Ala.; C. D. Beyer, L. & N. R. R., Pensacola, Fla.; T. R. Cowan, C. P. Ry., Montreal, P. Q.

QUERIES.

1. Can a paint be made that will dry from the bottom up?
2. What is the best method of making illuminated numbers for locomotive headlights?
3. What is the best method of treating front ends of locomotives, with a view of keeping them in good condition?
4. Is it advisable to add wax to varnish in order to deaden the luster in imitation of a rubbed surface?
5. Can a sand blast be operated successfully in a railway car and locomotive paintshop?
6. What is the best oil for rubbing the varnish inside of passenger cars to reduce the surface to a dead finish?
7. What is the cause of varnish turning white on locomotive tanks, and how to prevent it?

## PERSONAL.

*(For other personal mention see Elections and Appointments.)*

—Mr. A. T. Sabin, who became Chief Engineer of the Louisville & Atlantic on June 8, was born at Oneonta, N. Y., in 1855. He graduated at the Rensselaer Polytechnic Institute, at Troy, in 1878, and has served in various capacities on several roads, especially the Chesapeake & Ohio Southwestern.

—Mr. Epes Randolph, formerly Superintendent of the Tucson Division of the Southern Pacific, has been appointed General Manager of the Los Angeles & Pasadena Electric, with authority over the Pacific Electric and the Pasadena & Mt. Lowe, which are controlled by the first-named company. The appointment went into effect Aug. 1.

—Mr. Stephen T. Gage, who has been for many years connected with the Southern Pacific, retired from the service of the company on Aug. 1, on a pension of $500 a month. Mr. Gage was actively concerned in the building of this road, and served, later, as a confidential adviser to President Huntington. Mr. Gage had not performed active service for the Southern Pacific in several years, and his work had always been concerned more with the policy and corporate interests of the company than with its actual operation.

—Mr. Angus A. Grant, well known in the West as a railroad contractor, died at Los Angeles, July 20. At the time of his death he was Receiver of the California & Nevada, a short line running out of Oakland, Cal. In the '70's his firm was largely engaged in building the Atlantic & Pacific, now part of the Atchison, Topeka & Santa Fe road. He was also identified with the building of the Kansas Pacific, and the Denver & Rio Grande. From 1878 until the time of his death he was connected with the Santa Fe in contracts for building.

—Mr. Charles H. Tweed, the new President of the Houston & Texas Central, was born in Calais, Me., in 1844. He has been engaged in professional work for the greater part of his career, and it was not until 1883 that he became associated with a railroad. At that time he retired from partnership in the law firm of Evarts, Southmayd & Choate to become general counsel for the Central Pacific, the Chesapeake & Ohio, and allied corporations. He became general counsel of the Southern Pacific when that company was organized. Since then he has been Vice-President of the Central Pacific (Feb., 1900), Second Vice-President of the Southern Pacific (June, 1900), and from Sept., 1900, to the present time, Chairman of that company's Board of Directors.

—Mr. John C. Stubbs, who now has the title of General Director of Traffic in the consolidation of roads controlled by the Harriman interests west of the Missouri River, has previously been Third Vice-President of the Southern Pacific. He was born at Ashland, Ohio, in 1847, and has been in railroad service since 1869, when he entered the employ of the Pittsburgh, Cincinnati & St. Louis as clerk in the freight office. Since then he has filled the following positions: 1870, Chief Clerk in general freight office of the Central Pacific at Sacramento; 1871 to 1873, Assistant General Freight Agent, and then, for 20 years, General Freight Agent; 1882 to 1884, Freight Traffic Manager of the same road; 1884 to 1885, General Traffic Manager of the Central Pacific and leased lines, then for four years General Traffic Manager of the Southern Pacific, and from 1889 to date, Third Vice-President.

—Mr. James F. Maguire, recently made Assistant Superintendent of Transportation of the Erie, was born at Southfield, N. Y., in 1862, and has been continuously in railroad employ since he was sixteen years old. From 1878 to 1885 he was consecutively agent and operator of the Eastern Division of the New York, Lake Erie & Western. Then he served for a year as Train Despatcher of the same division, was Chief Despatcher until 1888, and then became Assistant Superintendent of the New York & Greenwood Lake and Southern of New Jersey Division of the same company. Since 1889 he has been Superintendent of the Western Division of the New York, Lake Erie & Western; Superintendent of the Susquehanna Division, which is now part of the Erie road, at Elmira, N. Y. Since March, 1899, he has been Superintendent of the New York Division of the Erie, with headquarters at Jersey City.

—Mr. Grinnell Burt, President of the Lehigh & Hudson River Railroad, died at his home, in Warwick, N. Y., Saturday, Aug. 3. On the day of the funeral, Tuesday, Aug. 6, the following order was issued from the office of the Superintendent of the company: "In respect to the memory of the late President of the Lehigh & Hudson River Railway Co., Mr. Grinnell Burt, all business of this company will be entirely suspended from 2 o'clock p. m., until 2.10 o'clock p. m." Mr. Burt was born in 1822, and entered railroad service in 1859, when, with others, he organized the Warwick Valley road, of which he was President until 1878. He was interested in the building of the Poughkeepsie bridge, and had been President, at different times, of the Middletown, Unionville & Water Gap, the Kanawha & Michigan, the Cincinnati, Van Wert & Michigan, and of the Wawayanda and the Pequest & Walkill. When the two latter were consolidated with the Warwick Valley in 1882, he became President of the combination, which took its present name of the Lehigh & Hudson River.

## ELECTIONS AND APPOINTMENTS.

*Arkansas & Louisiana.*—Wm. Cotter has been appointed General Superintendent, with office at St. Louis, Mo., vice J. M. Herbert.

*Arkansas Midland.*—The officers of this company are: President, George J. Gould, Lakewood, N. J.; Vice-President, C. G. Warner; General Manager, Russell Harding, both with offices at St. Louis, Mo.; Treasurer, A. H. Calef, New York; Local Treasurer, D. S. H. Smith; Secretary, E. G. Merriman, both with offices at St. Louis; Assistant Secretary, Francis Johnson, with office at Little Rock, Ark. (Railroad News, July 19, p. 524.)

*Arkansas Southern.*—W. H. Quigg has been appointed General Freight and Passenger Agent of this company, and W. J. Raef, Assistant General Freight Agent in charge of Freight Claims, with office at Ruston, La. These appointments went into effect July 11.

*Baltimore & Ohio Southwestern.*—C. Selden has been appointed Superintendent of Telegraph, with office at Baltimore, Md., vice C. T. Hendrickson.

*Birmingham Railway, Light & Power.*—The following Directors have been elected: A. M. Shook, Wm. A. Walker, R. H. Pearson, G. B. McCormack, B. F. Roden, J. K. Newman, H. M. Atkinson, Nat Baxter, Jr., M. V. Joseph, W. H. Kettig, Gordon Abbott, A. T. London, T. T. Hillman, N. E. Barker and Robert Jemison.

*Bismark, Washburn & Great Falls.*—F. D. Underwood has been elected Vice-President, succeeding J. W. Raymond.

*Cane Belt.*—J. Lane has been elected President of this company, vice Wm. Dunovant.

*Chatham & Lebanon Valley.*—W. Seward Webb is President of this company, with office at New York.

*Chesapeake & Western.*—Edgar W. Mills has been appointed General Auditor, with office at 141 Broadway, New York. This appointment went into effect July 17.

*Chicago & Northwestern.*—F. D. Taylor has been appointed General Baggage Agent, with office at Chicago, Ill., vice N. A. Phillips.

*Chicago Great Western.*—L. H. Stiles has been appointed Division Freight and Passenger Agent for the Cannon Valley Branch, Mankato to Red Wing, Minn., and the Duluth, Red Wing & Southern Branch, Red Wing to Zumbrota, Minn. Effective Aug. 1. R. F. Malone has been appointed Assistant General Passenger Agent, with headquarters at Chicago. Effective Aug. 1.

A. G. Briggs has been appointed General Solicitor, with office at St. Paul, Minn., vice D. W. Lawler.

*Chicago, Indiana & Eastern.*—The office of W. S. Whitney, General Freight and Passenger Agent, has been removed from Matthews, Ind., to Muncie, Ind.

*Chicago, Milwaukee & St. Paul.*—W. S. Howell has been appointed General Eastern Agent, in charge of freight and passenger traffic in the New York District. His appointment went into effect Aug. 1.

*Chicago, Rock Island & Mexico.*—The officers of this company are as follows: President, M. A. Low, Topeka, Kan.; Vice-President, General Superintendent and Chief Engineer, J. H. Conlen; Secretary, Treasurer, General Freight and Passenger Agent, J. Myers; Auditor and Cashier, A. E. Colemant; all with offices at Dalhart, Tex.

*Cincinnati, Hamilton & Dayton.*—Ira W. Bellows has been appointed General Southern Agent, with office at Cincinnati, Ohio, vice J. G. Mason.

*Cleveland, Cincinnati, Chicago & St. Louis.*—Wm. O'Connor has been appointed Contracting Agent, with office at Kansas City, Mo. John W. Irvine has been appointed Central Passenger Agent, with office at Cincinnati, Ohio, vice W. B. Tiernan, deceased. A. J. Coyne has been appointed Contracting Agent, with office at Chicago, Ill., vice T. F. Murphy.

*Denver & Rio Grande, Rio Grande Western.*—J. D. Kentworthy has been appointed General Agent of the Freight Department and B. F. Nevins Western Live Stock Agent, each for both companies, with offices at Salt Lake City, Utah. W. J. Shotwell has been appointed General Agent of the Freight Department and F. W. Thompson, General Agent of the Passenger Department, each for both companies, with offices at 625 Market street, San Francisco, Cal. J. D. Mansfield has been appointed General Agent for both companies, with office at 124 Third street, Portland, Ore. W. C. McBride has been appointed General Agent for both companies, with office at 47 East Broadway, Butte, Mont. E. Copeland has been appointed General Agent Freight Department, and H. E. Tupper, General Agent Passenger Department, both with headquarters at 353 Broadway, New York. Appointments went into effect Aug. 1.

*Detroit Southern.*—The Freight and Passenger Departments were placed under separate heads Aug. 1. Frank Ferris will continue as General Freight Agent, and Geo. M. Henry has been appointed General Passenger Agent, with headquarters at Detroit.

*East Tennessee & Western North Carolina.*—George W. Hardin has been appointed Superintendent, vice James E. Lawton. Appointment went into effect July 23.

*El Paso & Southwestern.*—The officers of this company are: President, Dr. James Douglas; First Vice-President, A. C. James; Second Vice-President, S. P. Hutchinson; General Superintendent. W. G. Choate; Division Superintendent in Arizona, R. C. Morgan; Division Superintendent in New Mexico, J. I. Logan.

*Erie.*—At a meeting, held Aug. 1, H. McK. Twombly was elected a Director of this company, to fill the vacancy in the Board. Mr. Twombly was also appointed a member of the Executive Committee. The following appointments went into effect Aug. 1: John F. Maguire, Assistant Superintendent of Transportation, with office at Jersey City; George T. Slade, Assistant General Manager of the Erie Division, with office at New York; William L. Derr, Superintendent of the New York Division, vice John F. Maguire, promoted; George A. Coe, Superintendent of the Susquehanna Division, vice William L. Derr, transferred; John M. Davis, Superintendent of the Wyoming and Jefferson Divisions, vice George T. Slade.

*Great Northern.*—G. T. Ross has been appointed General Superintendent of the Montana Central, of which he was previously Assistant General Superintendent.

*Great Northern Ry. of Canada.*—W. R. Russell has been appointed General Superintendent.

*Hilo.*—The officers of this company are: President, B. F. Dillingham; Vice-President, L. A. Thurston, both of Honolulu, Hawaii; Superintendent, W. H. Lambert, and Chief Engineer, C. H. Kluegel, both of Hilo, Hawaii.

*Hocking Valley.*—The office of Freight Claim Agent was abolished July 1.

*Houston & Texas Central.*—H. A. Jones has been appointed Freight Traffic Manager, vice C. W. Bein, deceased. Appointment went into effect July 1.

*Kansas City, Fort Scott & Memphis, Kansas City, Memphis & Birmingham.*—H. J. Cronin has been appointed Acting Auditor, with office at Kansas City, Mo. W. C. Melville has been appointed Northwestern Passenger Agent, with office at 205 South 14th street, Omaha, Neb. Appointment went into effect July 1.

*Lake Erie & Western, Fort Wayne, Cincinnati & Louisville, Northern Ohio.*—W. C. Brown has been elected Vice-President and General Manager, with office at Cleveland, Ohio.

*Louisville & Nashville.*—E. C. Runte has been appointed Passenger Agent, with office at New Orleans, La., vice R. L. McKibbin.

*Manchester & Oneida.*—J. L. Sullivan, of Cedar Falls, Iowa, has been appointed General Manager of this company.

*Mineral Range, Hancock & Calumet.*—W. W. Walker, previously Assistant General Freight Agent, has been appointed General Freight Agent, with office at Duluth, Minn., vice Wm. Orr, resigned. Appointment went into effect Aug. 1.

*Minneapolis, St. Paul & Sault Ste. Marie.*—W. C. Marshall has been appointed Assistant General Freight Agent, with office at Minneapolis, Minn. Formerly Contracting Freight Agent.

*Minnesota & International.*—C. S. Mellen has been elected President, with office at St. Paul, Minn., and D. S. Lamont, Vice-President, with office at New York. W. H. Gemmell has been appointed General Manager, with headquarters at Brainerd, Minn.

*Mississippi River, Hamburg & Western.*—The officers of this company are: President, C. G. Warner; Vice-President and General Manager, Russell Harding, both with offices at St. Louis, Mo.; Treasurer, A. H. Calef, with office at New York; Superintendent, General Freight and Passenger Agent, J. H. Schaefer, with office at Hamburg, Ark.

*Montour.*—J. D. Nicholson has been elected Second Vice-President, with office at Pittsburgh, Pa., vice D. R. Hanna.

*National Ry. of Tehuantepec.*—M. R. Mellor having resigned as Assistant Manager and Chief Engineer, these offices have been abolished, and W. J. Cox, General Superintendent, has assumed the duties formerly under the charge of the Assistant Manager in addition to those of his own office. J. E. McCurdy having resigned his position of Reconstruction Engineer on the Northern Division of this road, the following appoint-

ments have been made: Reconstruction Engineer Northern Division, Tom Bolton; Assistant Reconstruction Engineer Northern Division, H. Leslie Cole; Technical Engineer, J. B. Sutro. Appointments and changes went into effect June 30.

*New Orleans & Northwestern.*—Wm. Cotter has been appointed General Superintendent, with office at St. Louis, Mo., vice J. M. Herbert.

*Raritan Terminal & Transportation.*—Chas. W. Welch has been appointed Freight Traffic Manager, with office at New York, vice James Barker, resigned.

*Seaboard Air Line.*—The following Directors have been added to the Board: James M. Barr, F. R. Pemberton, E. B. Addison and Geo. W. Watts. The office of the General Agent of the Freight Traffic Department at Atlanta, Ga., is abolished, effective Aug. 1, with the resignation of Joseph M. Brown.

*Shreveport & Red River Valley.*—W. E. Green has been appointed General Superintendent, with office at Shreveport, La. Appointment went into effect July 18.

*Vera Cruz & Pacific.*—J. W. Gillespie, General Freight and Passenger Agent, has also been appointed Auditor, vice C. J. Nixon, resigned. J. R. King, previously Division Superintendent, has been promoted to be Superintendent. Appointments took effect June 1.

*Vicksburg & Southeastern.*—The officers of this company are: President, P. M. Harding; First Vice-President, W. J. Ferguson; Second Vice-President, I. N. Ellis; Treasurer, W. S. Jones; Secretary, W. H. Fitzhugh.

*Virginia & Southwestern.*—Grant R. Schley has been elected President of this company, with office at New York, vice Geo. L. Carter.

*Wabash.*—Harry E. Moores has been appointed General Agent, Passenger Department, with office at Omaha, Neb. Mr. Moores has also been appointed General Agent Passenger Department, of the Omaha, Kansas City & Eastern; Omaha & St. Louis; Kansas City & Northern Connecting.

## RAILROAD CONSTRUCTION.

### New Incorporations, Surveys, Etc.

Atchison, Topeka & Santa Fe.—It is said that an extension will be built from Paul's Valley, Okla. T., 25 miles northwest to Erin Springs, as part of the line between Paul's Valley and Chickasha, Okla. T., 50 miles northwest, which the company purposes to build jointly with the Chicago, Rock Island & Pacific.

Blue Ridge.—It is stated that this road, in South Carolina, will be extended across the Blue Ridge Mountains towards the Georgia line. A survey through the mountains has been made.

California Roads.—It is reported that a third preliminary survey has been commenced for a road to run from Paloma, Calaveras County, Cal., 10 miles south to Valley Springs, to connect with a narrow gage branch of the Southern Pacific at that point. The proposed road will carry supplies to the Gwin Mine.

Canadian Pacific.—An officer denies that the company intends adopting electric power on the high grades in the Rocky Mountains, as said in current newspaper reports.

Chicago Great Western.—This company is said to be about to make surveys for a cut-off from Des Moines northwest 75 miles to Lehigh, Iowa. The route along the Des Moines River Valley will be chosen if feasible, as the grades are easier, and coal lands are tapped.

Chicago, Milwaukee & St. Paul.—This company is said to be spending $1,000,000 in straightening curves, reducing grades and relaying tracks with heavier rails, between La Crosse, Wis., and St. Paul.

Chicago, St. Paul, Minneapolis & Omaha.—It is said that this company will build a branch about 20 miles eastward from Spring Valley, Wis.

Danville, Fourche Valley & Southern.—An officer writes that the route of this company (mentioned July 26, p. 540, as incorporated in Arkansas to build from Danville to Cobbs Ferry), has been located, and the contracts for grading, etc., have been let to the Danville Construction Co. The maximum grade of line is 2 per cent., and curve, 15 deg. There are no trestles, or iron or steel bridges required, and the company is now ready for bids on rail and rolling stock.

Dawson.—The incorporators of this company (July 19, p. 524) are: Clarence D. Simpson, Scranton, Pa.; Thomas H. Watkins, Charles B. Eddy, Alamogordo, N. Mex.; Benj. S. Harmon, New York; Wm. A. Hawkins, Alamogordo, N. Mex.; Alex. S. Greig, Ernest J. Dedman, Alamogordo. The head office is Alamogordo, Otero County, N. Mex.

Duluth, Virginia & Rainy River.—This company, incorporated April 3, under the laws of Minnesota, to build from Virginia, Minn., in the Rainy Lake country, has filed amended articles increasing its capital stock from $1,500,000 to $2,000,000, and has asked for bids for the first 20 miles of the line.

El Paso & Southwestern.—The Southwestern of Arizona has been re-incorporated under this name, and has increased its capital stock to $7,000,000. The company will build from Don Luis, on the Arizona & Southeastern, 22 miles west in Cochise County, Ariz., to Agua Prieta, on the International boundary line. It will also acquire the New Mexico & Arizona, and the Arizona & Southeastern, and will complete a line from Bisbee, N. Mex., to El Paso, Texas, by way of Deming, N. Mex., a total of 350 miles. The incorporators are: Walter Douglass, Stuart W. French, R. C. Morgan, Wm. H. Brophy, S. W. Clawson, Frederick A. Sweet, John A. Campbell and J. B. F. Taylor. (Aug. 2, p. 554.)

Glenfield & Western.—This company has been incorporated in New York to build a road from Glenfield, N. Y., in a westerly direction in the towns of Martinsburg, Turin and Highmarket, to the east line of Osceola, Lewis County, a total of 15 miles. Among the directors are A. S. Page, D. P. Fairchild, D. B. Page and T. A. Page, of Oswego, N. Y.

Goderich Electric.—Notice is given that an application will be made at the next session of the Provincial Parliament of Ontario, for a charter to build an electric railroad to run from Goderich, on Lake Huron, to Dunlop, Carlow, Dungannon and Lucknow; thence to Wingham, Brussels and Seaforth; thence through Brucefield and Varna to Bayfield, and from Bayfield to Goderich, making a county belt line, with branches, a total of considerably over 100 miles. M. C. Cameron, Dan McGillicuddy and J. T. Goldhrope, all of Goderich, are incorporators.

Great Falls & Canada.—The stockholders are said to have ratified the sale of this road, which extends from Great Falls, Mont., 200 miles north to Lethbridge, N. W. T., to the Great Northern. The latter company will widen it to standard gage.

Great Northern of Canada.—This company proposes to reduce the distance between Ottawa, Ont., and Montreal, Quebec, to 115 miles, by joining Bout-De-l'Ile with Joliette by means of a railroad and steel bridge. This extension will involve about 40 miles of new road.

Indiana, Illinois & Iowa.—It is announced that this road will start from Knox, Ind., and go direct to Toledo, Ohio, 162 miles northeast, instead of starting at South Bend, Ind., as first contemplated.

Iron Mountain & Greenbrier.—This company is said to have been incorporated in West Virginia, to build in Pocahontas and Greenbrier counties to White Sulphur Springs, W. Va. Capital stock, $100,000. Among the incorporators are: Thomas J. Shyrock, C. C. Homer and G. F. M. Houck, of Baltimore, Md.

Lake Erie & Detroit River.—An officer writes that it has been decided to relay the Erie & Huron Division, 71 miles in length, with 70-lb. rails, and that the contracts have been let. Work is to be begun in October.

Mexican Central.—It is said that this company will rebuild a large portion of the Monterey & Mexican Gulf when it assumes actual operation of that line some time this month.

Middleton & Danvers (Electric.)—This company has completed its right of way from Danvers, Mass., northwest to Lawrence, 15 miles, which completes a through line from Lawrence to Salem, 24 miles, except for a short stretch in Peabody.

Missouri Pacific.—Building is said to be in progress from Lake City, Mo., on the Lexington branch, 17 miles in a southerly direction to a connection with the main line.

Missouri Roads (Electric).—A company is said to have been formed with a subscribed capital stock of $2,000,000, to build a road from West Plains, Mo., via Bakersfield to Mountain Home, Ark., 50 miles, to connect the mineral regions of this section with the Kansas City, Fort Scott & Memphis. F. R. Cook, of West Plains, is interested.

New York & Stamford (Electric).—This company has been organized, with a capital of $500,000, consolidating the Larchmont and Port Chester electric companies, to build a road to Greenwich, Conn., which will constitute one of the connecting links between New York and Boston.

New Orleans & Pontchartrain.—This company, with a capital of $350,000, has been chartered in Louisiana to build railroads in the parishes of Orleans, Jefferson, St. Bernard, and elsewhere in that state. Among the stockholders are W. H. McAfee, G. E. Heath and E. J. Villars, of New Orleans. G. S. Kausler is President.

Ohio River & Charleston.—It is said that a preliminary survey is made for a line under consideration southeast from Johnson City, Tenn., to connect with the Seaboard Air Line in North Carolina.

Ohio Roads (Electric).—A franchise has been granted to D. H. Buell of Marietta, Ohio, to build an electric road from Marietta to St. Mary's Landing, 16 miles east along the Ohio River. The Ohio River branch of the B. & O. runs parallel, on the West Virginia side.

Petoskey & Harbor Springs.—This company has been incorporated in Michigan to build a line between the points named, about eight miles in a northerly direction, around the end of Little Traverse Bay. The gage will be 3½ ft. The stockholders are: Chas. A. Thatcher, Wm. P. Thatcher, John M. Ormond, George W. Blake and D. Charles Hart, of Toledo; D. T. Elmer and Fred D. Elmer, of Monroe, Mich.

Pittsburgh & Lake Erie.—Work is reported begun on the extension from Fayette City, Pa., 8½ miles southwest to Brownsville, which is on the edge of the Connellsville coke fields.

Schomberg-Aurora (Electric).—The contract for extending this new line from Richmond Hill to Schomberg, north of Toronto, has been let to Mackenzie & Mann. This is another of the links in the system of radial railroads, 500 miles of which are to be built out from Toronto in five lines of 100 miles each, at an estimated cost of $2,850,000 for the first 354 miles of tracks and roadway only.

Southern.—This company is said to have begun preliminary surveys for a Mobile & Ohio extension from Tuscaloosa to the coal and coke properties of the Alabama Consolidated Coal & Iron Co. and other industries.

St. Louis & San Francisco.—Surveys are reported for the proposed cut-off from Crocker, Pulaski County, Mo., 100 miles northeast to Clinton, Mo., to connect the main line with the Kansas City branch. This cut-off would give the St. L. & S. F. a route between St. Louis & Kansas City, 300 miles long, 100 miles less than the present indirect route by way of Springfield.

St. Louis Southwestern.—An amendment of the charter of this company has been filed at Austin, Texas, providing for four extensions of the system in Texas. These aggregate 150 miles and they will be built at once. They are from Renner, Texas, to Dallas, 13 miles (May 17, p. 342); from Hillsboro, Texas, to Whitney, 13 miles; from Gatesville, Texas, to Hamilton, 32 miles (Construction Supplement, March 8, 1901); and from Lufkin, Texas, to a point in Newton County, 90 miles.

Santa Fe Central.—The incorporators of this company (July 26, p. 540) are: Willard T. Hopewell, Hillsboro, N. Mex.; Wm. H. Andrews, Pittsburgh, Pa.; John T. McLaughlin, San Pedro, N. Mex.; Joseph E. Saint, Albuquerque, N. Mex.; Charles W. Dudrow, Santa Fe, N. Mex.

Southern Shore.—A charter has been granted to Mackenzie & Mann to build a line of railroad from Halifax to Yarmouth, N. S., under the above title, 217 miles. Forty miles of the road, from Yarmouth to Barrington, is already built and in operation. The estimated cost is $5,000,000.

Southwestern of Arizona.—See El Paso & Southwestern.

Tracey, Cedar Valley & Southwestern.—The track laying on this line, which is located in Marion County, Iowa, has been completed. L. G. Everist, of the Empire Coal Co., is President.

Weatherford, Mineral Wells & Northwestern.—Bids for grading, masonry and bridging of this company will be received at the general office at Weatherford, Texas, until 12 o'clock noon, Aug. 16. For details, see advertising columns.

West Michigan Traction.—This is the correct name of the company referred to Aug. 2 as the Western Traction. The stockholders are: C. O. Hadley, New York City; C. W. Haight, New Haven, Conn.; F. A. Henshaw, S. F. Marchant, Martha B. Howard, S. N. Howard, H. J. Jewett, L. B. Choates, C. B. Orvis and F. A. Woodbury, of Chicago.

## GENERAL RAILROAD NEWS.

Cincinnati Southern.—A meeting of the stockholders of the Cincinnati, New Orleans & Texas Pacific has been called for Aug. 26, to consider a proposed contract to extend the existing lease of Oct. 11, 1881, of the Cincinnati Southern. It is desired to make a long-time contract by which the company will gain an entrance into Cincinnati, and then over the Cincinnati, Hamilton & Dayton to the Lakes, and also will use the Monon tracks to Chicago and other points.

Detroit United.—The Everett-Moore syndicate announces that it has acquired control of the Detroit, Rochester, Romeo & Lake Orion, a 50-mile electric line between the points named, and also of the Detroit, Utica & Romeo, which holds franchises for the 35-mile line in a northerly direction as far as Romeo, Mich.

Great Northern.—The property of the Portland & Puget Sound has been attached for $1,667,200, by the Seattle & Montana, both being proprietary lines of the Great Northern. The Portland & Puget Sound was organized to build from Seattle, Wash., to Portland, Ore.

Iowa Central.—The directors have been authorized to issue 4 per cent. gold bonds not to exceed $25,000,000, to pay or redeem outstanding obligations of the company, and of such other companies as may be acquired by consolidation, construction or purchase.

It is said that the directors of this company have agreed to exchange their stock for that of the Minneapolis & St. Louis, at the rate of one share M. & St. L. to be given for every two shares of Iowa Central. It is thought that this is a preliminary step to the absorption of the consolidated properties by the Illinois Central.

Louisville & Nashville.—By a decision of the Alabama Supreme Court, the freight and passenger depots of the L. & N. at Birmingham, Ala., have been assessed at $95,000 and the company will have to pay the tax on them. This class of property has not heretofore been taxed in the state.

Missouri Pacific.—Two amendments to this company's charter have been filed in Kansas, providing for increases in capital stock to the extent of $45,000,000. The stock of the company is now in the neighborhood of $80,000,000, there having been four increases before these last two. The recent increase is to provide for the expenditure which the company is making this year in Kansas and Colorado.

Mobile & Ohio.—Application has been filed in the Chancery Court in Mississippi, by stockholders of this company who refused to concur in the sale of the road to the Southern, asking for the appointment of a receiver.

Northern Pacific.—Judge Hanford of the United States Court at Tacoma, Wash., has filed a decision against the United States on the suit brought to cancel the Northern Pacific land patents in Clarke and Chehalis Counties, Cal. The suit will be appealed to the Circuit Court.

Northwestern Elevated (Chicago).—This company has taken over the charter, franchise and all the property of the Union Elevated, of Chicago. The price paid was $6,250,000, which will net $125 a share to holders of the stock of the Union. At a meeting of the stockholders of the Northwestern, it was voted to issue $15,000,000 of 4 per cent. first mortgage convertible bonds, in order to retire the existing issue of $5,000,000 first mortgage bonds, a certificate of indebtedness of $750,000, and to pay for the Union property.

Ottawa Northern & Western.—This company has taken over the Hull Electric, operating 10 miles between Ottawa and Aylmer, Que., for the sum of $1,000,000 cash and bonds. It is purposed to use this line in connection with the Pontiac Division worked by steam.

Savannah, Florida & Western.—On Sept. 2, the shareholders will vote on a proposition to absorb by consolidation the following subsidiary companies: Ashley River; Abbeville Southern; Green Pond, Walterboro & Branchville; Southwestern Alabama.

Sioux City & Pacific.—The following legal documents, involving the sale of this road to the Chicago & Northwestern, have been filed in Iowa: An assignment by the United States to the Chicago & Northwestern of the Government's right, title and interest in the Sioux City & Pacific, in consideration of the purchase price, less $250,000, for mail contracts; a release to the Sioux City & Pacific R. R. Co. of the United States Government claim as executed by the Chicago & Northwestern; and a release of the Sioux City & Pacific first mortgage as executed by the Northern Trust Co., successor trustee for John L. Blair. This mortgage deed was made to secure the payment of $1,628,000 of bonds issued Jan. 1, 1868, and payable in 30 years, at 6 per cent. interest.

Southern.—This company has acquired, through lease, from Edward T. Stotesbury, of Philadelphia, 35 locomotives and 3,375 freight cars, for which the company agrees to pay $602,330 on or after Sept. 30, and half yearly thereafter 2 per cent. on $2,400,000, or such sum as this shall be reduced to by a sinking fund. The sinking fund will receive $180,000 in March, 1902, and in September, 1902, and thereafter, $170,000 semi-annually until 1908.

Union Pacific.—The Leavenworth & Lawrence branch of this road, which has been in receiver's hands for several years, is reported as sold for $900,000, to Judge W. R. Kelly, of Omaha, for the Union Pacific. The road will be operated as part of the Union Pacific system.

Washburn, Bayfield & Iron River.—This road, 35 miles in length, running in a westerly direction from Washburn, Wis., to the points named, is ordered sold in foreclosure, Aug. 20, at Washburn. The upset price is $225,000.